MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE.

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INTRODUCTION.

The MONTHLY WEATHER REVIEW for February, 1898, is based on 2,929 reports from stations occupied by regular and voluntary observers, classified as follows: 147 from Weather Bureau stations; numerous special river stations; 32 from post surgeons, received through the Surgeon General, United States Army; 2,583 from voluntary observers; 96 received through the Southern Pacific Railway Company; 13 from Life-Saving stations, received through the Superintendent United States Life-Saving Service; 31 from Canadian stations; 20 from Mexican stations; 7 from Jamaica, W. I. International simultaneous observations are received from a few stations and used, together with trustworthy newspaper extracts and special reports.

Special acknowledgment is made of the hearty cooperation of Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Mr. Curtis J. Lyons, Meteorologist to the Government Survey, Honolulu; Dr. Mariano Bárcena, Director of the Central Meteorological Observatory of Mexico; Mr. Maxwell Hall, Government Meteorologist, Kingston, Jamaica; Capt. S. I. Kimball, Superintendent of the United States Life-Saving Service; and Commander J. E. Craig, Hydrographer, United States Navy.

The REVIEW is prepared under the general editorial supervision of Prof. Cleveland Abbe.

Attention is called to the fact that the clocks and self-registers at regular Weather Bureau stations are all set to seventy-fifth meridian or eastern standard time, which is exactly five hours behind Greenwich time; as far as practicable, only this standard of time is used in the text of the REVIEW, since all Weather Bureau observations are required to be taken and recorded by it. The standards used by the public in the United States and Canada and by the voluntary observers are believed to generally conform to the modern international system of standard meridians, one hour apart, beginning with Greenwich. Records of miscellaneous phenomena that are reported occasionally in other standards of time by voluntary observers or newspaper correspondents are generally corrected to agree with the eastern standard; otherwise, the local meridian is mentioned.

STORM WARNINGS AND WEATHER FORECASTS.

By Lieut. Col. H. H. C. DUNWOODY, Supervising Forecast Official.

Under this head it is proposed to make note of all extreme and injurious weather conditions occurring during the month, and the warnings of the same issued by the Bureau, with instances, as far as reported by observers or the press, in which these warnings were of special public benefit. The signals displayed by the Weather Bureau will be referred to as "information," "storm," "hurricane," "cold-wave," and "norther," respectively.

The injurious weather conditions of most marked note that occurred during the month were the frosts and freezing weather in Florida on the 2d, 3d, and 4th; the severe storms on the New England Coast of the 1st, 15th, and 16th; and the heavy snow and wind storm that moved from Texas northeastward across the country to New England from the 18th to the 22d. Frosts and freezing temperatures also occurred in the truck-raising regions of Texas on the 3d, 6th, and 21st.

THE FLORIDA FROSTS OF FEBRUARY 2–4, 1898.

Severe cold weather prevailed in Florida on the 2d, 3d, and 4th, with frosts on the 2d as far south as Jupiter. Following are the minimum temperatures reported from Jacksonville, Tampa, and Jupiter, respectively, viz: February 2, 26°, 31°, 40°; February 3, 32°, 38°, 50°; February 4, 34°, 34°, 52°.

Warnings of these injurious conditions were sent as follows, viz: At 9:32, February 1, telegrams to Jacksonville, Tampa, and Jupiter, reading:

Freezing weather in north half of Florida and frosts as far south as Jupiter Wednesday morning. Notify postmasters and give to railroads.

At 10:43 a. m., on the 1st, an additional message was sent to Tampa, as follows:

Freezing weather will extend as far south as your station to-night.

Warnings, substantially the same as the foregoing, were also issued on the mornings of the 2d and 3d.

As showing the benefits derived from the warnings, the following extracts from the reports of observers and newspaper publications are given.

From A. J. Mitchell, Section Director, Jacksonville, Fla.:

All warnings were received sufficiently early for proper distribution. Every possible medium for reaching the various interests of the State was utilized so acceptably that not a complaint has been heard from any quarter regarding the character and distribution of the information. As a whole, the forecast was verified perfectly. The phraseology of the warning was happily selected, being such as to leave no one in doubt as to the probable extent of the cold weather. This office telegraphed the warning to about 140 stations. They were also distributed by the frost-whistle signal of the Florida Central and Peninsular Railroad, which traverses the State, and likewise the Plant System, the Florida East Coast Line, and river steamers on the St. Johns and Indian rivers. From this office alone cards, maps, and telegrams, numbering in the aggregate quite four hundred, were given the public. These, supplemented by cards from forecast distributing centers and the mediums cited above, show a very extensive distribution of the warnings throughout the State.

Coming so early after the freeze of January, the vegetable interest had not assumed normal proportions and the cold was not of such intensity as to destroy citrus trees. However, a great deal of good resulted from the warnings, and the appreciation was general. The total amounts submitted as saved by fruit and vegetable growers alone reach $68,000; and it is but just to say that the figures represent only a part

of the true total, there being hundreds who were benefited, directly or indirectly, from whom no information can be obtained.

In considering the value of warnings it is necessary to take into account almost every human enterprise, particularly in this latitude. Freezing temperatures affect kiln enterprises, such as brick making. One manufacturer informed me that the warning enabled him to save several hundred thousand brick. The small gardeners were especially elated over the warning, and as their savings contribute to the remuneration of the various corporations, it is seen that the importance of such information permeates all walks of business life. Fruit dealers of this city who had bananas en route were enabled to telegraph employees to regulate the temperature of cars to such a degree as to save fruit. Farmers and market dealers took advantage of the information and slaughtered hogs. No information is more important to the farmer who has a lot of hogs to kill, as curing meat in this country is largely dependent upon the degree of cold. Many hogs were killed and the three days of cold were sufficient for a perfect cure of meat. Information of coming cold weather (freezing) does not, perhaps, influence such matters in more northern latitudes where freezing conditions are expected from October to March, but in this State where it is not infrequent for winters to pass without low temperatures, advance information of decided thermal changes means much to many business interests. So it is seen that, when the fruit and vegetable grower is injured to some extent, the damage is partially neutralized by benefits in other directions.

Following are excerpts from letters received from a few of the beneficiaries of the warnings:

"We get the greatest benefit from the warnings, as they are in ample time for us to cover our gardens and plants. We saved $400."

"The weather reports are a great help to the farmers in this section. We saved $1,500."

"Our trees were full of young growth and bloom. We saved about all. The frost whistle signal by train was a great help to us. It gave not only notice of the cold wave, but also notice to labor that would be needed. So we had a good force ready for work."

"The value of property protected was $20,000, all of which was saved. The service is of great value and highly appreciated by the people."

"Value of property protected $100,000. But little lost. Warnings came in ample time on the 1st, 2d, and 3d, and were highly appreciated by the people."

From J. E. Lanouette, Observer, Weather Bureau, Tampa, Fla.:

The warning of the 1st was received unusually early, 9 a. m., local time, and the cold-wave signal was immediately hoisted. The truckers had ample notice of the freeze and they lost no time in taking precautionary measures.

The two railroad agents were promptly notified, also the superintendent of the South Florida Telegraph Company, and they immediately sent the warning to all points on their lines.

In addition to this, this office notified 14 different postmasters over the Western Union Telegraph Company, as directed by your office. The same disposition was made of the warnings of the 2d and 3d.

In this immediate vicinity there is no doubt but that a large quantity of vegetables were saved that otherwise would have been killed.

Irish potatoes were plowed under, strawberries and other low plants were covered with mulching of straw and paper, young orange trees were wrapped or covered with earth above the bud, and taken all in all it is safe to say that the warning was promptly heeded by those engaged in the different agricultural pursuits.

The temperature on the 2d fell to 31°, and considerable thin ice formed in this locality.

But little, if any damage, was done on the 3d and 4th. Ordinarily these temperatures, 38° and 35°, would have been sufficient to cause a heavy white frost, but owing to the unusual dryness of the atmosphere the conditions were not favorable for its formation.

From J. W. Cronk, Observer, Jupiter, Fla.:

The people with much gratification report little injury done in this section. Only on the morning of the 2d was damage reported. On that date tender vegetables, grown since the cold weather in January, were hurt a little in low, unprotected spots, otherwise the damage practically amounted to nothing.

The temperature here, at Jupiter, on the morning of the 2d was down to 40°, and light frost was recorded.

Jacksonville, Fla., Daily Metropolis, February 5, 1898.—Tuesday the warnings sent out of the approaching freeze by the Weather Bureau did immense service in Florida, and saved thousands of dollars by giving people time to protect their fruit trees and vegetables from the wintry blasts. All had ample time to defend their property against the ice king, which came precisely as forewarned.

Leesburg, Fla., Leesburg Commercial, February 4, 1898.—Announcement of the coming cold wave reached Leesburg from the Weather Bureau on Tuesday in ample time for orange growers and truckers to prepare to meet it, and many of them protected their vegetables and orange trees.

Too much in praise can not be spoken of the Government Weather Bureau for the promptness with which the farmers of South Florida were informed of the coming cold.

Tampa, Fla., Daily Herald, February 2, 1898.—Probably one of the best predictions made by the Weather Bureau this winter was that issued by the Central Office yesterday. It stated that freezing weather would extend as far south as Tampa, and frosts as far south as Jupiter by Wednesday morning. That this forecast was verified in a remarkable degree is shown by the reports this morning. At Tampa it fell to 31°, Jacksonville 26°, and Jupiter 40°, with a light frost. * * *

The Chief of the Weather Bureau personally wired the observer to give the warning as wide a distribution as possible, and it is probable that all places in Florida having a telegraph were notified by the Tampa and Jacksonville offices not later than 10 a. m. There is no doubt but this warning saved thousands of dollars worth of perishable property throughout the northern half of the State.

Tampa, Fla., Daily Times, February 2, 1898.—There was nothing the matter with the Weather Bureau yesterday. Its warnings were timely and accurate, and the dissemination of information throughout the vegetable and fruit-growing section of Florida covered as large an area as was possible. It is a pleasure for the Times to compliment the Bureau by giving due credit for service rendered.

De Land, Fla., Florida Agriculturist, February 16, 1898.—A few years ago, notably just after the damaging freeze of 1895, there was bitter complaint on the part of the fruit and vegetable growers at the Climate and Crop Service of the Weather Bureau. It was contended that adequate warning of the approach of the cold wave was not given, and, as a result of the failure, much property that might have been protected and saved was frozen and destroyed.

We are pleased to say that our constituents, the fruit and vegetable growers of the State, have been much better served during the present season than ever before. In fact the service of the Bureau now appears to be everything that could be desired. As an evidence of the efficiency of the service that is now being given our people, that last cold wave period might be taken as a sample. The Bureau for the Florida section, located at Jacksonville, just before the coming of the cold wave in question, sent out over one hundred telegrams, advising the people of the approaching cold wave.

In addition to the matter of disseminating the information of approaching cold waves by wire, the Bureau has arranged with the railroad companies to sound frost warning signals on the locomotive whistles. As many sections of the fruit and vegetable growing regions of Florida are remote from telegraph offices, this method of giving frost warnings is undoubtedly good. It was effectively used during the last cold wave, and many growers, who otherwise would have lost everything, were enabled to prepare for the frost and protect their tender vegetables and plant beds.

The temperature fell to freezing at Jacksonville, Fla., on the morning of February 22, and heavy frost was reported from that station on the morning of the 23d. Warnings of "frost and freezing weather in northern Florida" were sent to Jacksonville, Tampa, and Jupiter on the morning of the 21st.

FROST IN TEXAS.

As showing the warnings issued in connection with the frosts that occurred in the truck-growing regions of Texas on the 3d, 6th, and 21st, and the benefits derived therefrom, the following extracts from reports of Dr. I. M. Cline, Local Forecast Official and Section Director, Galveston, Tex., are given:

As the a. m. weather map of February 2, 1898, showed conditions advancing which might give injurious temperatures in the trucking section Thursday morning, February 3, the following special warning was issued:

"Temperature may fall to 31° 50 to 100 miles from Galveston and 39° at Galveston Thursday."

The following are the temperature conditions recorded on Thursday, February 3, 1898, in the section for which the forecast was made: Galveston, 39°; Houston, 32°; Missouri City, 32°; Conroe, 30°; and Brenham, 28°.

As in the case of previous warnings, vegetation was protected generally on the strength of the warning of February 2, and saved from injury by the cold of the following morning.

The a. m. weather map of February 5, 1898, presented conditions very favorable for frost in this vicinity on the following morning, and a special warning was made and distributed by mail with the regular a. m. forecast, as follows:

"Probably frost 50 to 100 miles from Galveston, with temperature 34°, and minimum 42° at Galveston, Sunday morning."

The following temperatures occurred Sunday morning in the districts for which the forecast was made: Galveston, 42.2°; Houston, 42.2°; Missouri City, 36°; Brenham, 36°; and Conroe, 34°. Light frost occurred in exposed places to the coast line and on adjacent islands as far in as Galveston.

The warnings were heeded by truck growers, who protected their vegetables and prevented injury.

The weather conditions at 8 a. m., Sunday, February 20, 1898, indicated that injurious frosts might occur on the following morning in this vicinity, and the following special forecast made and distributed:

"Frost 50 to 100 miles from Galveston, with temperature 34°, and minimum temperature 43° at Galveston, Monday morning."

Frost occurred to the coast line Monday morning, and in many localities killed much tender vegetation and put strawberries back two to three weeks where not protected. Through the instrumentality of the warning, which was mailed to all points within reach, besides being telegraphed out, the greater portion of the crops was saved from injury.

Temperatures were recorded in the district forecast for, as follows, on Monday, February 21, 1898: Galveston, 41.3°; Houston, 36.5°; Missouri City, 33.0°; and Conroe, 30.0°.

Acknowledgments have been received from a few of those who made use of the warnings, from which the following are extracted:

"Alvin, C. W. Benson.—Protection given to hot beds and early vegetation, and saved probably $1,500 worth. Temperature went to 34°.

"Hulen, Fred W. Malley.—Warning of February 20 enabled me to save $300 worth of truck, which, without the warning, I would have lost.

"Arcadia, W. W. Sloan.—Warning resulted in saving of small vegetables and berries.

"Missouri City, C. F. Mercer.—Frost warning received fourteen hours in advance of frost. Vegetation was protected."

It is estimated by local dealers that part of the early crop of vegetables susceptible to injury by frost at this time is worth about $10,000, and more than half of this was saved from injury. Also the following newspaper extract:

Galveston, Tex., Galveston Evening Tribune, February 3, 1898.—The local weather bureau, through yesterday's Tribune, gave the midday condition of the weather in Texas, predicting colder weather, and a special warning was issued by the local weather office in the interest of the truck growers of this section. The cold weather arrived in accordance with the prediction and low temperature prevailed generally over Texas this morning. * * * * * *

Not a single injurious frost has occurred this winter, in this vicinity, that has not been predicted by the local weather bureau. As a result of these predictions the coast country farmers have been enabled to protect their crops and very little damage has resulted. As an illustration of how the news from the Weather Bureau is circulated, what occurred at Alvin yesterday may be cited. Over 200 truck farmers reside at Alvin and vicinity. As soon as the forecast was made by the Galveston office, warnings were telegraphed to all stations in the coast country and during the day flags were displayed and red lights shown at night.

The farmers of the coast country place a great deal of reliance in the predictions of the Weather Bureau.

STORMS OF FEBRUARY 1, 15, AND 16, ON THE NEW ENGLAND COAST.

The severe storm of February 1, as it began in January, will be found fully treated of in the REVIEW for January, 1898.

The storm which visited the New England Coast on February 15–16 developed in Montana and moved southeastward across the Lake Region. It was accompanied by heavy snow in the lower Lake Region, but did not assume an especially severe character until the night of the 15th, when it reached the New England Coast. Pressures of 28.80 and 28.88 were reported from Portland and Boston, respectively, at 8 a. m. of the 16th. Information signals for this storm were ordered from Eastport to Delaware Breakwater at 10 a. m. of the 15th. These were changed to storm-southeast at 1 p. m., and storm-southwest ordered as far south as Hatteras. The following maximum velocities during the twelve hours ending at the hours named were recorded, viz: 16th, a. m., Eastport, 56; Block Island, 48; Nantucket, 36; New York, 46; Atlantic City and Norfolk, 48; Hatteras, 52. 16th, 8 p. m., Eastport, 56; Portland, 38; Boston, 44; Woods Hole, 54; Nantucket, 42; Block Island, 60; Sandy Hook, 42; Atlantic City, 45; Cape May, 48.

THE HEAVY SNOW AND WIND STORMS OF FEBRUARY 18–22.

Concerning the warnings for this storm issued from the Chicago office, Prof. E. B. Garriott, in charge of that station, reports:

The only severe storm which was felt within the Chicago forecast district during the month of February was the one which developed in the lower Mississippi Valley during the night of the 18th, moving northward to northern Illinois and then slowly eastward to the middle Atlantic Coast.

Advisory messages in the interests of shipping were sent to the open ports on Lake Michigan, as follows: The 18th, 9 p. m., "Brisk northeast winds on Lake Michigan to-night and Saturday;" the 19th, 10 a. m., "Snow, high east to north winds indicated;" the 20th, "Dangerous northeast to north gales on the Lake, with snow, followed Monday by much colder weather." No vessels left Chicago during the 19th and 20th, and the steamship *City of Traverse*, which left St. Joseph, Mich., at 7 a. m. on the 20th bound for Milwaukee, was unable to make that port and was obliged to run into the Chicago harbor for refuge.

Warnings for heavy snow and high northeast to north winds were sent at 10 a. m. on the 19th to Upper and Lower Michigan, Wisconsin, Iowa, southern Minnesota, and the extreme northern portions of Illinois and Indiana, and similar warnings were again issued at 10 a. m. on the 20th to Upper and Lower Michigan, eastern Wisconsin, Chicago, and Indianapolis. These warnings were issued mainly in the interests of transportation companies and were fully verified, the snowfall in some portions of the Upper Lake Region exceeding 18 inches.

Heavy precipitation in connection with this storm fell in New York and New England on the 21st and 22d, and gales occurred on the middle Atlantic and New England coasts on the 20th and 21st.

Northeast storm signals were ordered from Portland to Delaware Breakwater and southeast thence to Hatteras at 2:30 p. m. of the 19th, with the following message, viz:

Storm in central Mississippi Valley moving slowly northeast, likely to cause dangerous easterly gales on the Atlantic Coast between Hatteras and Portland by Sunday morning, with rain in the Middle Atlantic States and snow in New York and New England.

The following maximum velocities during the twelve hours ending at the hours named were reported, viz: 8 a. m. of 20th, Block Island and Sandy Hook, 46. 8 p. m. of 20th, Block Island, 68; New York, 46; Sandy Hook, 36. 8 a. m. of 21st, Nantucket, 46; Block Island, 54; New York, 44; Sandy Hook, 40.

The following telegram in connection with the warnings issued for this storm, published in the Washington Evening Star of February 21, 1898, is given:

Boston, February 21.—The northeasterly storm which began yesterday increased to-day. Rain fell in torrents. The weather off the coast was very severe, the gale causing high tides and a heavy sea. Few vessels were caught, however, owing to the timely warning given by the Weather Bureau. The storm was more severe in the southwestern part of New England. There was practically no direct communication by telegraph with New York, the full force of the storm having been felt south of Albany.

On February 15 and 16 warnings of a norther in Montana were issued from the Weather Bureau office at Chicago, concerning which Mr. J. Warren Smith, Section Director at Helena, Mont., reports:

The "norther" flag was displayed at this office and at the other display stations in the State, and active steps were taken to distribute the warnings as widely as possible. The warning of the 15th was sent to over 200 different places, and that of the 16th to about 400.

Warnings were generally received from two to twenty-four hours in advance of the storm. The storm was not severe in any section, but the following extracts from reports show that stock was placed in a protected location as far as possible and that direct benefits resulted.

Clark Ranch: Warnings were distributed to 11 sheep stations; owing to warnings there was no loss.

Big Sandy: Stock kept near protection and shelter; storm not bad.

Dodson: Stock was driven in on short notice.

Bercail: All sheepmen were mindful that their stock was in safe quarters; the efforts of the Bureau were much appreciated by the stockmen.

Lewiston: These warnings reached the owners of about $2,000,000 worth of sheep and about $50,000 worth of cattle. The stock saved by the precautions taken on account of confidence placed in the signals would doubtless number several thousand sheep and cattle. Then, too, the precautions taken and proper shelter being provided, not only prevented actual loss of sheep, but also protected them from severe exposure, thus preventing any suffering, which always causes a retardation in the growth of wool, makes a break in the fibre, and renders the wool less marketable. Hence, the benefits to the stock interests would reach a great deal further than the mere preventing of the loss of life among herds.

The following newspaper extracts in relation to the forecasts and warnings generally are given as of interest in this connection:

Record, Cleveland, Tenn., February 25, 1898.—The weather predictions sent to this office by the U. S. Government have been unusually beneficial this winter. There has been so little cold weather that farmers scarcely know when to save their pork, and weather predictions became very necessary. The predictions are received every day about 9:45 a. m.

Pensacola, Fla., News, February 11, 1898.—The weather service is regarded with the deepest interest by all citizens and cognizance is taken of every inaccuracy.

It is especially gratifying to state that during the past month, January, not a single imperfect forecast was issued from our local office. Considering the large maritime interests of Pensacola, which depends upon the accuracy of weather predictions, this is worthy of special mention. Where good and faithful work has been done it should be commended.

Our Weather Bureau has grown to be such an institution that we, as a nation, would not only feel its loss, but be almost at sea in our daily routine of life without it.

AREAS OF HIGH AND LOW PRESSURE.

By Prof. H. A. HAZEN.

There were 10 high and 8 low areas sufficiently well defined to be traced during the month. The paths will be found on Charts I and II, and the principal facts as to appearance, disappearance, duration, and velocity are given in the accompanying table.

HIGHS.

The principal locus of high areas was to the north of Montana, where 7 out of the 10 were first noted. The remaining three originated in the lower Missouri Valley. Numbers VII and VIII were last seen to the north of Lake Superior, and the other 8 could be traced to the Atlantic. The weather conditions have been remarkably mild. Only one cold wave of any severity was experienced, and that only in the Mississippi Valley as high area VII moved across Montana. The fall in temperature in twenty-four hours on February 17, a. m., was 34° at Miles City. On the evening of the same day the area of fall of 32° covered eastern Kansas. The morning map of February 18 showed a fall of 34° at St. Paul.

LOWS.

Five low areas were first noted off or near the north Pacific Coast. Nos. II and III had their origin north of Montana, and VII on the south Pacific Coast. No. VI was last seen in the lower Lake Region, and the remaining 7 disappeared off the north Atlantic Coast or else in the St. Lawrence Valley.

As low area No. XII of January reached the northeast coast it caused the highest winds of the month, namely, 71 miles an hour at Nantucket, and 70 at Woods Hole, a. m. of February 1. A wind of 68 miles was noted at Cleveland p. m. of 15, as low area No. IV passed to the eastward. The lowest pressure of the month 28.80 inches occurred at Portland, Me., as this same low area passed up the Atlantic Coast a. m. of the 16th. As low area No. VII approached the northeast coast, p. m. of the 20th, a wind of 68 miles was reported from Block Island.

Movements of centers of areas of high and low pressure.

Number.	First observed.			Last observed.			Path.		Average velocities.	
	Date.	Lat. N.	Long. W.	Date.	Lat. N.	Long W.	Length.	Duration.	Daily.	Hourly.
High areas.		°	°		°	°	*Miles.*	*Days.*	*Miles.*	*Miles.*
I	31, p. m.*	42	98	2, a. m.	33	84	970	1.5	647	27.0
II	1, a. m.	52	114	4, p. m.	46	59	3,680	3.5	1,052	43.8
III	4, p. m.	42	102	10, p. m.	36	78	3,970	6.0	662	27.6
IV	8, p. m.	52	109	11, p. m.	42	69	2,380	3.0	793	33.0
V	11, p. m.	37	102	13, p. m.	32	84	1,640	2.0	820	34.2
VI	14, p. m.	53	110	18, a. m.	40	72	2,370	3.5	677	28.2
VII	16, p. m.	51	116	19, p. m.	49	81	1,560	3.0	520	21.7
VIII	19, a. m.	50	114	22, p. m.	50	58	1,800	3.5	514	21.4
IX	22, a. m.	55	113	27, a. m.	50	86	1,590	5.0	318	13.3
X	26, p. m.	49	109	1, p. m.†	37	73	2,400	3.0	800	33.3
Total							22,360	34.0	6,803	
Mean of 10 tracks							2,236		680	28.3
Mean of 34 days									658	27.4
Low areas.										
I	1, a. m.	51	97	3, a. m.	46	74	1,110	2.0	555	23.1
II	2, p. m.	47	127	5, p. m.	48	72	2,920	3.0	973	40.5
III	5, a. m.	51	110	13, p. m.	48	53	4,450	8.5	524	21.8
IV	11, p. m.	53	117	15, a. m.	50	68	2,160	3.5	617	25.7
V	13, a. m.	53	121	17, p. m.	49	53	3,600	4.5	800	33.3
VI	15, a. m.	51	124	18, a. m.	42	84	2,460	3.0	820	34.2
VII	17, a. m.	31	112	23, a. m.	41	67	3,240	6.0	540	22.5
VIII	19, a. m.	48	128	28, p. m.	49	60	3,770	9.5	397	16.5
Total							23,710	40.0	5,226	
Mean of 8 tracks							2,964		653	27.2
Mean of 40.0 days									593	24.7

*January, † March.

THE WEATHER OF THE MONTH.

By A. J. HENRY, Chief of Division of Records and Meteorological Data.

The statistical aspect of the weather of the month is presented in the tables which form the closing part of this REVIEW. The numerical values in the tables have been generalized in a number of cases, the results appearing on Charts Nos. III to IX, inclusive. Table I in particular contains a variety of details from which the reader may select those most interesting to himself.

PRESSURE AND WIND.

Normal conditions.—The geographic distribution of normal barometric readings at sea level and under local gravity for February in the United States is shown by Chart VIII of the MONTHLY WEATHER REVIEW for February, 1893.

The normal values for February, as compared with those for January, are lower by about 0.05 inch (from 30.20 to 30.15) over the Plateau and Rocky Mountain regions and the South Atlantic Coast States; elsewhere the changes are slight.

The regions of relatively high pressure in February are nearly coincident with those of January (see page 5 of this volume). The only change is an extension of the western area to the northeastward as regards its position in January; in February it covers southern Idaho, northern Utah, Wyoming, Montana, the Dakotas, Nebraska, and western Minnesota.

Pressure is lowest over the north Pacific Coast and the Canadian Maritime Provinces, whence it decreases to the areas of low pressure occupying the North Atlantic and Bering Sea, respectively.

Northwesterly winds prevail on the Atlantic Coast, and northeasterly or easterly on the Gulf Coast. In northern Texas the prevailing winds are northwesterly, as on the plains, while westerly or southwesterly winds prevail over western Texas. In southern Arizona the winds of winter are northerly, while in central Arizona they may be either southwesterly or easterly.

On the Pacific Coast the winds generally coincide with the direction of the coast line; on the upper half of the coast, say from Eureka northward, southerly or southwesterly winds are most likely to prevail; on the southern half northwesterly

winds are most frequent. The winds of the Rocky Mountain and Plateau regions are variable, southwesterly winds generally prevailing west of the mountains and northwesterly on the eastern slope and the plains beyond. The winds of the middle and upper Mississippi Valley are westerly or northwesterly; westerly winds also prevail in the upper Lake Region, while the winds of the lower Lake Region and Ohio Valley are generally southwesterly.

The current month.—Pressure was above the normal over the greater part of the United States, being 0.05 inch or more in excess at the following stations, viz, Salt Lake City, Idaho Falls, Santa Fe, New Orleans, Mobile, Chattanooga, and Eastport.

Pressure has been above normal in the middle Plateau Region continuously since December last.

Pressure was below normal on the North Pacific Coast and over a portion of the northern slope and upper Missouri Valley, the greatest deficits being 0.13 inch at Tatoosh Island; 0.10 at Havre; 0.09 at Fort Canby, Roseburg, and Rapid City, respectively.

The winds were, on the whole, quite variable. The resultant direction for each station is shown on Chart IV by an arrow which flies with the wind. The numerical values of Tables I and VII should be consulted for further details.

TEMPERATURE OF THE AIR.

Normal conditions.—The normal mean temperature of the air in the United States in February varies from about 71° at Key West, 58° at Jacksonville, 58° at New Orleans, 57° at Galveston, 55° at San Diego to 22° at Eastport, 21° at Burlington, 24° at Buffalo, 26° at Detroit, 14° at Duluth, 1° at St. Vincent, 13° at Havre, 28° at Spokane, and 40° at Seattle, on Puget Sound. The warmest regions, as may be seen from the above figures, are the South Atlantic, Gulf, and Pacific Coast States; the coldest are the Red River Valley of the North and contiguous territory. The Pacific Coast is somewhat warmer than the Atlantic, and both are considerably warmer than the interior.

The differences between the normal temperatures of January and February are small, as may be seen by comparing the above figures with those on pages 5 and 6 of this volume. The greatest increase of heat from one month to the next occurs in the northwest, or near the middle of the continent.

The current month.—The month, like its immediate predecessor, was mild and open. The temperature was below the normal in the South Atlantic States, yet no unusual cold was experienced in that region. The lowest temperatures of the month east of the Rocky Mountains occurred on the 2d and 3d. During this period freezing weather was experienced as far south as Tampa, Fla., and westward along the Gulf Coast to Mobile. Light frost occurred on the east coast of Florida as far south as Jupiter.

The lowest minimum temperature of the month, 33° below zero, was registered in northern New England and Minnesota on the 1st and 3d, respectively.

On the immediate Pacific Coast the temperature did not fall below the freezing point during the month, and in California freezing temperatures were not recorded at any Weather Bureau station, although voluntary observers on the higher levels report a number of such temperatures. The line of zero temperature (Chart VI) crosses the Rocky Mountains in southern Colorado and follows the trend of the main chain into the British Possessions.

The highest temperatures of the month, 90° and over, occurred in the Rio Grande Valley. Maximum temperatures of 80° and over occurred in Florida, Texas, southern New Mexico, Arizona, and California. The lowest maxima, 40° and under, occurred in the Lake Superior region.

The distribution of the observed monthly mean temperature of the air over the United States and Canada is shown by red lines (isotherms) on Chart VI. This chart also shows the maximum and the minimum temperatures, the former by broken the latter by dotted lines. As will be noticed, these lines have been drawn over the Rocky Mountain Plateau Region, although the temperatures have not been reduced to sea level; the isotherms relate, therefore, to the average surface of the country in the neighborhood of the various observers, and as such must differ greatly from the sea-level isotherms of Chart IV.

The average temperatures of the respective geographic districts, the departures from the normal of the current month and from the general mean since the first of the year, are presented in the table below for convenience of reference:

Average temperature and departures from the normal.

Districts.	Number of stations.	Average temperature for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	10	30.7	+ 3.5	+ 3.7	+ 1.8
Middle Atlantic	12	34.5	0.0	+ 3.1	+ 1.6
South Atlantic	10	46.3	− 3.3	+ 0.9	+ 0.4
Florida Peninsula	7	64.0	− 3.1	− 2.1	− 1.0
East Gulf	7	52.0	− 2.6	+ 1.9	+ 1.0
West Gulf	7	54.2	+ 2.6	+ 8.6	+ 4.3
Ohio Valley and Tennessee	12	36.9	− 1.1	+ 4.2	+ 4.1
Lower Lake	8	27.9	+ 1.4	+ 5.3	+ 2.6
Upper Lake	9	22.6	+ 3.0	+ 8.6	+ 4.3
North Dakota	7	14.7	+ 7.5	+22.6	+11.3
Upper Mississippi	11	28.7	+ 2.6	+10.3	+ 5.2
Missouri Valley	10	30.8	+ 6.4	+15.6	+ 7.8
Northern Slope	7	30.1	+ 9.2	+14.2	+ 7.1
Middle Slope	6	38.6	+ 6.2	+ 9.8	+ 4.9
Southern Slope	6	46.5	+ 6.0	+10.2	+ 5.1
Southern Plateau	13	52.3	+ 3.7	+ 0.6	+ 0.3
Middle Plateau	9	37.9	+ 4.0	− 4.0	− 2.0
Northern Plateau	10	35.8	+ 8.6	+ 6.8	+ 3.4
North Pacific	9	44.6	+ 4.2	+ 5.1	+ 2.6
Middle Pacific	5	51.0	+ 1.8	− 1.0	− 0.5
South Pacific	4	55.8	+ 2.4	− 0.3	− 0.2

In Canada.—Professor Stupart says:

Over the greater part of the Dominion the mean temperature of the month was considerably above average; in fact, the only portions where it was lower than average were northern Alberta and western Saskatchewan, where it was from 1° to 2° below. In Manitoba, northern Ontario, Nova Scotia, and Prince Edward Island the excess amounted to between 6° and 8°.

Review of the season.—Thus far the winter has been one of the mildest experienced for a number of years, except in California and the middle Plateau Region. The weather in Montana and the Dakotas, especially, has been extremely mild. In the Lake Region there has been less ice than usual, and the prospects for an early opening of navigation are good. According to reports received by Section Director Brandenburg, of the Colorado Climate and Crop Service, less snow than usual has fallen in the mountains of that State.

Although considerable snow fell in January in Idaho, Utah, western Wyoming, and Arizona, the amount that fell during February was below the average. On the whole there appears to be less water in sight for irrigating purposes than there was a year ago.

The weather of December and January in California, and generally throughout the Plateau Region, was dry and cold. It is reported that during January ice formed in the Grand Canyon of the Colorado at a depth of from 4,000 to 6,500 feet below the mesa.

PRECIPITATION.

Normal conditions.—The regions of heavy precipitation in February are, as in January, on the north Pacific Coast, the lower Mississippi Valley, Tennessee, and the mountainous regions of North Carolina and Georgia.

The regions of moderate precipitation west of the Rocky Mountains are portions of California, the Puget Sound country, and the Willamette Valley. In the central valleys and the east moderately heavy precipitation occurs in the middle Mississippi Valley, the Lake Region and Ohio Valley, the Atlantic seaboard, New England, and Florida. The regions of scant or variable precipitation are the upper Mississippi and Missouri valleys, the plains west of the one-hundredth meridian, and the Rocky Mountain and Plateau regions. Under normal conditions, therefore, the greater part of the United States lies within the region of moderately heavy rains or snows, aggregating, say, from 2 to 4 inches during the month.

The current month.—The geographic distribution of precipitation for the current month is shown on Chart III.

Three regions of heavy precipitation appear on the chart as follows: (1) the north Pacific Coast, (2) the lower Mississippi Valley, and (3) New England. The precipitation in New England was mostly in the form of snow, as shown by Chart VIII.

The most striking feature of the month was the drought that prevailed in southern Virginia, North Carolina, South Carolina, Georgia, and Tennessee. The rainfall of this region was not more than three-quarters of an inch on the average, less than 50 per cent of the normal fall.

General rains fell over the greater part of California on the 24th, thus terminating what promised to be a very disastrous drought in that State.

Averages and departures by districts are summarized for convenience of reference in the following table:

Average precipitation and departures from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		Inches.		*Inches.*	*Inches.*
New England	10	5.02	143	+1.50	+2.10
Middle Atlantic	12	2.06	61	−1.30	−2.00
South Atlantic	10	1.30	34	−2.50	−5.20
Florida Peninsula	7	1.49	56	−1.20	−3.50
East Gulf	7	4.15	93	−0.30	−2.80
West Gulf	7	2.19	65	−1.20	−0.70
Ohio Valley and Tennessee	12	1.53	36	−2.70	+0.20
Lower Lake	8	2.56	97	−0.10	+1.10
Upper Lake	9	2.37	127	+0.50	+0.80
North Dakota	7	0.55	73	−0.20	−0.70
Upper Mississippi	11	1.58	80	−0.40	+0.70
Missouri Valley	10	0.96	70	−0.40	0.00
Northern Slope	7	0.21	41	−0.30	−0.60
Middle Slope	6	1.20	150	+0.40	+1.20
Southern Slope	6	1.09	100	0.00	0.00
Southern Plateau	9	0.36	28	−0.90	−0.60
Middle Plateau	13	0.48	41	−0.70	−1.80
Northern Plateau	10	1.42	83	−0.30	−1.10
North Pacific	9	9.25	153	+3.20	+0.10
Middle Pacific	5	4.65	115	+0.60	−3.40
South Pacific	4	0.98	38	−1.60	−3.20

In Canada.—Prof. R. F. Stupart says:

In British Columbia, and eastward across the territories, almost to Qu'Appelle, the precipitation was in excess of average, particularly in Saskatchewan and northern Alberta, where the snowfall was exceptionally great. From Qu'Appelle eastward across Manitoba to Lake Superior there was a general deficiency, ranging from a little less than to about half the average amount. East of this again, in Algoma and Nipissing, and thence southward to Lakes Ontario and Erie, an excess was general, excepting in Frontenac and contiguous counties. In Quebec the snowfall was unusually large, but in the Maritime Provinces the precipitation was nowhere greater than average, and in many parts there was a decided deficiency.

SNOWFALL.

The total snowfall for the current month is given in Tables I and II, and its geographic distribution is shown on Chart VIII. Much snow fell in Wisconsin, Michigan, northern New York, and New England, the depth in the latter averaging over 3 feet in portions of Maine, New Hampshire, and Vermont.

Two unusually severe snowstorms occurred during the month. The first is described by Mr. J. W. Smith, Section Director of the New England Climate and Crop Service, in his January report as follows:

Heavy snow fell all night of January 31–February 1, and the wind attained the velocity of a gale of from 50 to 70 miles per hour from the northeast. On the morning of February 1 New England was completely snow-bound. The snow, which was damp and clinging, together with the wind, completely annihilated overhead wires of all sorts; transportation lines were almost completely blocked and traffic was not resumed with regularity for several days; thousands of suburban residents who earn their daily living in the city of Boston were unable to move from their homes.

The second storm was confined to the States of Iowa, Minnesota, Wisconsin, Michigan, northern Illinois and Indiana, and Ohio.

Mr. W. M. Wilson, Section Director of the Wisconsin Climate and Crop Service, reports upon the storm as follows:

The total snowfall at Milwaukee exceeded 24 inches, and in many places accumulated to a depth of from 10 to 15 feet. All business was more or less interfered with, but the street railway lines suffered the greatest inconvenience. The mail trains were delayed from eight to twenty-four hours, especially from the south and west, and in one instance a train was literally buried by snow which had drifted into a cut. Not since the memorable snowstorm of March 2–4, 1881, has there been a snowstorm of equal severity in this locality.

In its movement to the eastward this storm was attended by rain, hail, and sleet. In some localities the rain froze as it fell, forming a coating of ice several inches in thickness on all exposed objects. Much damage was done to trees and shrubbery of all kinds. In New England the storm was reported as being the most severe of its kind since 1837.

Snow on ground at end of month.—At the end of the month the depth of snow in the Rocky Mountain and Plateau regions was very much less than on the corresponding date a year ago. It was also considerably less than on January 31, 1898, much snow having disappeared in Arizona, Nevada, Utah, Colorado, Wyoming, and Montana. There was practically no snow in the Missouri Valley, and the Ohio Valley below Pittsburg was also free from snow. The snow covering in Maine, New Hampshire, and Vermont at the end of the month was unusually heavy. Depths ranging from 40 to 70 inches were reported in Maine, 10 to 40 inches in New Hampshire and Vermont, and from 10 to 20 inches in Massachusetts. This great body of snow seriously interfered with lumbering operations throughout northeastern New England. The financial loss is placed at not less than $1,000,000.

In Canada.—Prof. R. F. Stupart says:

In Quebec the depth of snow on the level ranges is between 3 and 5 feet, and in New Brunswick, while there is not a great quantity near the Bay of Fundy, there are from 3½ to 5 feet in the central and northern portions. In Saskatchewan the depth is from 30 to 40 inches, but in Manitoba from 6 to 20 inches is the general report and in southern Alberta there is practically none. In Ontario there is little near Lake Ontario, and especially toward the eastern end.

ICE IN THE RIVERS AND HARBORS AT THE CLOSE OF THE MONTH.

There was a slight increase in thickness of ice in the Lake Region as compared with January 31, 1898. Elsewhere there was a general decrease. The following summary is taken from the Snow and Ice Chart of February 28, prepared by the Climate and Crop Division:

Mississippi River.—River open below bridge at Burlington, Iowa; still blocked above the bridge.

Hudson and Mohawk rivers.—Ice in the Hudson soft; no harvesting along river except behind dikes. No change in condition of ice in the Mohawk River.

Kennebec River.—Ice 17 inches thick.

Connecticut River.—Open to navigation south of Middletown.

HAIL.

The following are the dates on which hail fell in the respective States:

Alabama, 19. Arizona, 18. Arkansas, 19, 26, 27. California, 7, 27. Florida, 19. Indian Territory, 9, 18. Kentucky, 11. Louisiana, 11, 19, 26, 27. Mississippi, 10, 19, 25, 26. Missouri, 19, 25, 26, 27. Nebraska, 9. Nevada, 3, 8, 21. New Mexico, 8. North Carolina, 5, 20. Oklahoma, 8, 9. Oregon, 3, 6, 7, 15, 16, 17, 18, 20, 21. Texas, 2, 10, 18, 26, 27. Washington, 6, 7, 13, 24. West Virginia, 15, 19, 20.

SLEET.

The following are the dates on which sleet fell in the respective States:

Alabama, 5, 26, 28. Arizona, 8. California, 27. Connecticut, 14, 15, 20, 21, 22. Georgia, 5, 26. Idaho, 15, 16, 18. Illinois, 4, 17, 18, 19. Indiana, 4, 5, 12, 19, 20. Iowa, 9, 10, 11, 12, 14, 17, 19. Kansas, 9, 10, 18, 19. Kentucky, 4, 5, 15, 20. Louisiana, 2. Maine, 18, 20, 21, 22, 23. Maryland, 8, 15, 18. Massachusetts, 11, 15, 19, 20, 21, 22. Michigan, 4, 9, 10, 20, 21. Minnesota, 6, 10, 20. Missouri, 4, 14, 17, 18, 19, 25. Montana, 13, 15, 16, 21. Nebraska, 4, 8, 9, 10, 14, 15. Nevada, 6, 7, 21, 24, 25. New Hampshire, 5, 6, 15, 16, 20, 21, 22. New Jersey, 14, 22, 23. New Mexico, 18. New York, 5, 14, 18, 19, 20, 21. North Carolina, 17, 18, 20, 27. North Dakota, 6. Ohio, 5, 11, 14, 15. Oklahoma, 18. Oregon, 16, 18, 20. Pennsylvania, 5, 14, 18, 20, 21. South Carolina, 5, 26. South Dakota, 1, 3, 10. Tennessee, 4, 5, 20, 26. Texas, 9. Utah, 6, 7. Vermont, 20, 21, 22, 23. Virginia, 18, 20. Washington, 1, 15, 16, 17, 18, 19, 20, 21, 22. West Virginia, 15, 17, 18, 21. Wisconsin, 15.

ATMOSPHERIC ELECTRICITY.

Numerical statistics relative to auroras and thunderstorms are given in Table IX, which shows the number of stations from which meteorological reports were received, and the number of such stations reporting thunderstorms (T) and auroras (A) in each State and on each day of the month, respectively.

Thunderstorms.—The dates on which the number of reports of thunderstorms for the whole country were most numerous were: 19th, 78; 20th, 77; 9th, 74.

Reports were most numerous from Louisiana, 58; Mississippi, 50; Texas, 45; Missouri, 35; Arkansas, 32; Ohio, 31.

Auroras.—The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four preceding and following the date of full moon, viz, from the 2d to the 10th, inclusive.

The greatest number of reports were received for the following dates: 17th, 16; 11th, 13; 13th, 12.

Reports were most numerous from North Dakota, 20; Minnesota and Montana, 18 each.

In Canada.—Auroras were reported as follows: Father Point, 13, 17; Quebec, 17; Toronto, 16; Port Arthur, 12, 13; Minnedosa, 10, 11, 16, 20; Medicine Hat, 16; Swift Current, 16, 17, 18, 19; Calgary, 21; Prince Albert, 13, 15, 19. Battleford, 10, 11, 17, 20.

No thunderstorms were reported.

WIND.

High winds and local storms.—Winds of 50 miles per hour or over prevailed on the New England Coast on the 1st, 15–16th, and 20th–23d; also on the south Atlantic Coast on the 15th and 16th, and at sundry other places, as shown by the table below. Although the wind did not reach a velocity of 50 miles per hour in the Lake Region much inconvenience and serious interruption to traffic of all kinds were caused by the high winds and snow on the 1st, and again on the 15th, 20th, and 21st. There were no tornadoes during the month so far as known.

The maximum wind velocity at each Weather Bureau station for a period of five minutes is given in Table I, which also gives the altitude of Weather Bureau anemometers above ground.

Following are the velocities of 50 miles and over per hour registered during the month:

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
		Miles				*Miles*	
Block Island, R.I.	1	55	ne.	Eastport, Me	1	66	ne.
Do.	16	60	nw.	Do.	16	54	e.
Do.	20	66	e.	Do.	22	50	ne.
Do.	21	54	e.	Do.	23	52	e.
Boston, Mass.	1	50	ne.	Hatteras, N.C.	16	52	w.
Canby, Fort, Wash.	5	64	se.	Helena, Mont	13	50	sw.
Do.	6	62	se.	Knoxville, Tenn.	15	52	w.
Do.	7	54	se.	Lexington, Ky	15	60	sw.
Do.	9	58	se.	Nantucket, Mass	21	50	se.
Do.	11	70	se.	Norfolk, Va.	15	59	nw.
Do.	19	66	se.	Northfield, Vt	16	54	nw.
Do.	22	64	se.	Tatoosh Island, Wash.	18	54	nw.
Do.	24	75	s.	Do.	20	50	s.
Do.	25	63	s.	Wilmington, N. C	16	51	w.
Cleveland, Ohio	15	65	nw.	Woods Hole, Mass	1	70	nw.
Denver, Colo.	4	53	w.	Do.	16	56	w.

HUMIDITY.

The humidity observations of the Weather Bureau are divided into two series; the first or tridaily series began in 1871 and ended with 1887; the second or twice-daily series is continuous from 1888 to the present time.

In the present state of knowledge respecting the diurnal variation in the moisture of the air, we are scarcely warranted in combining the two series in a general mean.

The monthly means of the second or present series are based upon observations of the whirled psychrometer at 8 a. m. and 8 p. m., seventy-fifth meridian time, which corresponds to 5 a. m. and 5 p. m., Pacific; 6 a. m. and 6 p. m., Mountain; and 7 a. m. and 7 p. m., Central standard time.

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
	%			%	
New England	81	+6	Missouri Valley	74	−3
Middle Atlantic	73	−1	Northern Slope	65	−4
South Atlantic	69	−9	Middle Slope	63	−3
Florida Peninsula	74	−8	Southern Slope	58	−12
East Gulf	74	−4	Southern Plateau	41	−7
West Gulf	74	+1	Middle Plateau	65	+3
Ohio Valley and Tennessee	73	−1	Northern Plateau	75	−3
Lower Lake	80	0	North Pacific Coast	80	−5
Upper Lake	84	+3	Middle Pacific Coast	77	+1
North Dakota	76	−5	South Pacific Coast	71	0
Upper Mississippi Valley	77	0			

The normal for any district can be obtained by adding the departure to the average of the current month when the current humidity is below the normal (—), and subtracting it when it is above (+).

In using the table by means of which the amount of moisture in the air is computed from the readings of the wet and dry bulb thermometers, the pressure argument has almost always been neglected, an omission that has little significance except for low temperatures and at high stations, such as Santa Fe, El Paso, Cheyenne, and a few others. The failure to apply a correction for the influence of the prevailing pressure on the psychrometer has the effect of making the monthly means of relative humidity at high-level stations too small by quantities ranging from 5 to 10 per cent. In the application of the monthly averages of the table below, or those of individual stations in Table I, to special inquiries, whether in the departments of biology, climatology, or sanitary science, this fact should be kept in mind. It should also be remembered that the hours at which observations in the Rocky Mountain

Plateau Region are made, viz, from 5 to 6 local mean time, morning and afternoon, give approximately the maximum and minimum values for the day; therefore, monthly means calculated from such hours approach more nearly the true mean of the month than is the case on the Atlantic seaboard and in the seventy-fifth meridian time belt.

SUNSHINE AND CLOUDINESS.

The quantity of sunshine, and therefore of heat, received by the atmosphere as a whole is very nearly constant from year to year, but the proportion received by the surface of the earth depends upon the absorption by the atmosphere, and varies largely with the distribution of cloudiness. The sunshine is now recorded automatically at 21 regular stations of the Weather Bureau by its photographic, and at 47 by its thermal effects. The photographic record sheets show the apparent solar time, but the thermometric records show seventy-fifth meridian time; for convenience the results are all given in Table IX for each hour of local mean time. In order to complete the record of the duration of cloudiness these registers are supplemented by special personal observations of the state of the sky near the sun in the hours after sunrise and before sunset, and the cloudiness for these hours has been added as a correction to the instrumental records, whence there results a complete record of the duration of sunshine from sunrise to sunset.

The average cloudiness of the whole sky is determined by numerous personal observations at all stations during the daytime, and is given in the column "average cloudiness" in Table I; its complement, or percentage of clear sky, is given in the last column of Table IX for the stations at which instrumental self-registers are maintained.

The percentage of clear sky (sunshine) for all of the stations included in Table I, obtained as described in the preceding paragraph, is graphically shown on Chart VII. The regions of cloudy and overcast skies are shown by heavy shading; an absence of shading indicates, of course, the prevalence of clear, sunshiny weather. The formation of fog and cloud is primarily due to differences of temperature in a relatively thin layer of air next to the earth's surface. The relative position of land and water surfaces often greatly increases the tendency to form areas of cloud and fog. This principle is perhaps better exemplified in the Lake Region than elsewhere, although it is of quite general application. The percentage of sunshine on the lee shores of the Lakes is always much less than on the windward shores. Next to the permanent influences that tend to form fog and cloud may be classed the frequency of the passage of cyclonic areas.

The current month.—From Chesapeake Bay southward to the Gulf and westward to the Pacific, including almost all of the territory south of the thirty-fifth parallel, sunshiny weather prevailed the greater part of the time. The southwest was especially clear and bright, there being over 70 per cent of sunshine at all stations. The regions of great cloudiness, and consequently little sunshine, were the north Pacific Coast and the Lake Region. The sunshine in both these regions was about the same as for the preceding month.

The average cloudiness by geographic districts, and the departure from the normal conditions are given in the table below. The mean values have been computed from the numerical data of Table I.

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	6.0	+0.5	Missouri Valley	4.7	−0.7
Middle Atlantic	4.8	−0.8	Northern Slope	4.9	+0.1
South Atlantic	3.8	−1.5	Middle Slope	3.7	−0.7
Florida Peninsula	3.5	−1.1	Southern Slope	2.7	−2.1
East Gulf	3.5	−2.0	Southern Plateau	2.3	−0.7
West Gulf	4.1	−1.7	Middle Plateau	5.9	+1.1
Ohio Valley and Tennessee	6.1	−0.1	Northern Plateau	6.9	+0.2
Lower Lake	8.0	+1.2	North Pacific Coast	8.0	+1.0
Upper Lake	7.2	+0.9	Middle Pacific Coast	6.2	+1.4
North Dakota	4.7	−0.4	South Pacific Coast	4.0	−0.1
Upper Mississippi Valley	5.7	+0.4			

FOREST FIRES.

Numerous forest fires broke out in the South Atlantic States about the middle of the month. No rain had fallen for some time, and the forest and swamp lands were very dry. The fires were fanned by the high southwest winds of the 15th, and spread with great rapidity, notwithstanding the efforts of the citizens to check them. Many buildings, fences, and bridges were burned and much lumber was destroyed, the losses aggregating upward of $1,000,000. The fires devastated portions of the counties of Moore, Richmond, Cumberland, Union, Bladen, Robeson, Pender, and Sampson in North Carolina; Marlboro, Sumter, Aiken, Berkeley, Darlington, Orangeburg, Colleton, Barnwell, Marion, Chesterfield, Richland, Lexington, Fairfield, Williamsburg, Georgetown, and Florence in South Carolina.

CLIMATE AND CROP SERVICE.

By JAMES BERRY, Chief of Climate and Crop Service Division.

The following extracts relating to the general weather conditions in the several States and Territories are taken from the monthly reports of the respective sections of the Climate and Crop Service. The name of the section director is given after each summary.

Rainfall is expressed in inches.

Alabama.—The mean temperature was 46.1°, or slightly below normal; the highest was 82°, at Rock Mills on the 12th, and the lowest, 10°, at Madison on the 4th. The average precipitation was 2.10, or 3.35 below normal; the greatest monthly amount, 6.82, occurred at Alco, and the least, 0.39, at Clanton.—*F. P. Chaffee.*

Arizona.—The mean temperature was 50.4°; the highest was 90°, at Buckeye on the 6th, and the lowest, zero, at Tuba on the 3d. The average precipitation was 0.20; the greatest monthly amount, 1.50, occurred at Fort Apache, while none fell at many stations.—*W. T. Blythe.*

Arkansas.—The mean temperature was 45.8°, or 1.6° above normal; the highest was 82°, at Magnolia on the 13th, and the lowest, 7°, at Winslow on the 3d. The average precipitation was 2.08, or 1.82 below normal; the greatest monthly amount, 5.28, occurred at Pocahontas, and the least, 0.47, at Silversprings.—*F. H. Clarke.*

California.—The mean temperature was 49.4°, or 1.6° above normal; the highest was 95°, at Salton on the 26th, and the lowest, 1° below zero, at Bodie on the 9th. The average precipitation was 2.95, or 0.23 below normal; the greatest monthly amount, 22.25, occurred at Upper Mattole, while none fell at several stations.—*W. H. Hammon.*

Colorado.—The mean temperature was 30.7°, or 5.3° above normal; the highest was 77°, at Lamar and Minneapolis on the 16th, and the lowest, 23° below zero, at Rangely on the 10th. The average precipitation was 0.39, or 0.67 below normal; the greatest monthly amount, 2.54, occurred at Ruby, while none fell at several stations.—*F. H. Brandenburg.*

Florida.—The mean temperature was 57.5°, or about 3.0° below normal; the highest was 89°, at Minneota Park on the 19th, and the lowest, 20°, at De Funiak Springs on the 1st. The average precipitation was below normal; the greatest monthly amount, 5.97, occurred at Pensacola, and the least, 0.02, at Myers.—*A. J. Mitchell.*

Georgia.—The mean temperature was 46.5°, or 3.7° below normal; the highest was 83°, at Quitman on the 12th, and the lowest, 5°, at Diamond on the 4th. The average precipitation was 1.09, or 3.81 below normal; the greatest monthly amount, 2.70, occurred at Morgan, and the least, 0.34, at Washington.—*J. B. Marbury.*

Idaho.—The mean temperature was 30.7°; the highest was 69°, at Pollock on the 21st, and the lowest, 18° below zero, at Lake on the 23d.

The average precipitation was 1.51; the greatest monthly amount, 6.99, occurred at Murray, and the least, 0.02, at Lost River.—*D. P. McCallum.*

Illinois.—The mean temperature was 30.5°, or 1.8° above normal; the highest was 71°, at Cisne and Golconda on the 10th, and the lowest, 16° below zero, at Scales Mound on the 1st. The average precipitation was 2.02, or 0.19 below normal; the greatest monthly amount, 4.23, occurred at Greenville, and the least, 1.07, at New Burnside.—*C. E. Linney.*

Indiana.—The mean temperature was 32.5°, or slightly above normal; the highest was 72°, at Washington on the 5th, 10th, and 11th, and the lowest, 9° below zero, at South Bend on the 2d and 3d. The average precipitation was 1.87, or 1.47 below normal; the greatest monthly amount, 3.24, occurred at Farmland, and the least, 0.85, at Logansport.—*C. F. R. Wappenhans.*

Iowa.—The mean temperature was 24.2°, or slightly above normal; the highest was 62° at Keosauqua on the 8th, and the lowest, 18° below zero, at Iowa Falls on the 1st. The average precipitation was 1.20, or slightly below normal; the greatest monthly amount, 3.65, occurred at Cedar Rapids, and the least, 0.10, at Denison.—*G. M. Chappel.*

Kansas.—The mean temperature was 36.9°, or 5.0° above normal; the highest was 77°, at Meade on the 16th, and the lowest, 7° below zero, at Fanning on the 1st. The average precipitation was 1.21, or 0.16 above normal; the greatest monthly amount, 3.04, occurred at Wichita, while none fell at several stations.—*T. B. Jennings.*

Kentucky.—The mean temperature was 37.4°, or nearly normal; the highest was 77°, at Greensburg on the 10th, and the lowest, 3° below zero, at Caddo and Maysville on the 3d. The average precipitation was 1.60, or 2.30 below normal; the greatest monthly amount, 3.49, occurred at Caddo, and the least, 0.62, at Bardstown.—*G. E. Hunt.*

Louisiana.—The mean temperature was 54.7°, or nearly normal; the highest was 84°, at Lafayette on the 10th, 20th, and 22d, and the lowest, 18°, at Mansfield on the 3d. The average precipitation was 5.46, or 0.66 above normal; the greatest monthly amount, 12.50, occurred at the Southern University Farm (near New Orleans), and the least, 1.74, at Bastrop.—*R. E. Kerkam.*

Maryland and Delaware.—The mean temperature was 33.7°, or 1.5° above normal; the highest was 70°, at Charlotte Hall, Md., on the 12th, and at Pocomoke City, Md., on the 15th, and the lowest, 6° below zero, at Deerpark, Md., on the 2d. The average precipitation was 1.62, or 1.65 below normal; the greatest monthly amount, 3.21, occurred at Deerpark, Md., and the least, 0.70, at Boettcherville, Md.—*F. J. Walz.*

Michigan.—The mean temperature was 22.4°, or 1.3° above normal; the highest was 59°, at Ypsilanti on the 11th, and the lowest, 22° below zero, at Baldwin on the 3d. The average precipitation was 2.36, or 0.55 above normal; the greatest monthly amount, 5.77, occurred at Grand Rapids, and the least, 0.70, at Lake City.—*C. F. Schneider.*

Minnesota.—The mean temperature was 16.4°, or 3.0° above normal; the highest was 59°, at Two Harbors on the 8th, and the lowest, 42° below zero, at Tower on the 1st. The average precipitation was 1.02, or slightly above normal; the greatest monthly amount, 2.22, occurred at Caledonia, and the least, 0.29, at Ada.—*T. S. Outram.*

Mississippi.—The mean temperature was 49.3°, or 1.2° below normal; the highest was 80°, at Fayette on the 10th, and the lowest, 14°, at Booneville on the 2d, and at Ripley on the 3d. The average precipitation was 2.96, or 2.35 below normal; the greatest monthly amount, 8.00, occurred at Bay St. Louis, and the least, 0.99, at Okolona.—*R. J. Hyatt.*

Missouri.—The mean temperature was 35.5°, or 3.5° above normal; the highest was 78°, at Halfway on the 16th, and the lowest, 9° below zero, at Bethany on the 1st. The average precipitation was 1.62, or 0.54 below normal; the greatest monthly amount, 3.53, occurred at New Palestine, and the least, 0.21, at Nevada.—*A. E. Hackett.*

Montana.—The mean temperature was 30.1°, or 8.4° above normal; the highest was 63°, at Greatfalls on the 5th, and the lowest, 21° below zero, at Kipp and Poplar on the 19th. The average precipitation was 0.40, or slightly below normal; the greatest monthly amount, 1.92, occurred at Columbia Falls, and the least, trace, at Bigtimber, Fort Benton, and Wibaux.—*J. Warren Smith.*

Nebraska.—The mean temperature was 30.6°, or 8.0° above normal; the highest was 70°, at Benkelman on the 8th, and the lowest, 9° below zero, at Hay Springs and Springview on the 2d. The average precipitation was 0.43, or 0.29 below normal; the greatest monthly amount, 3.30, occurred at Nemaha, while none fell at several stations in the western portion of the State.—*G. A. Loveland.*

Nevada.—The mean temperature was 36.9°, or about 5.0° above normal; the highest was 79°, at St. Thomas on the 27th, and the lowest, 2° below zero, at McGill on the 8th, and at Toano on the 9th. The average precipitation was 0.29, or about 0.75 below normal; the greatest monthly amount, 1.75, occurred at Lewers Ranch, while none fell at several stations.—*R. F. Young.*

New England.—The mean temperature was 27.1°, or 3.8° above normal; the highest was 60°, at Lake Cochituate, Mass., on the 10th, and the lowest, 38° below zero, at Plymouth, N. H., on the 3d. The average precipitation was 5.20, or 1.65 above normal; the greatest monthly amount, 11.35, occurred at Belfast, Me., and the least, 1.87, at Nantucket, Mass.—*J. W. Smith.*

New Jersey.—The mean temperature was 32.7°, or 1.3° above normal; the highest was 65°, at Paterson on the 10th and at Franklin Furnace on the 13th, and the lowest, 15° below zero, at Rivervale on the 4th. The average precipitation was 3.48, or 0.58 below normal; the greatest monthly amount, 5.45, occurred at Paterson, and the least, 1.55, at Cape May City.—*E. W. McGann.*

New Mexico.—The mean temperature was 41.0°, or 3.9° above normal; the highest was 84°, at Hillsboro on the 26th, and the lowest, 8° below zero, at Buckmans on the 3d. The average precipitation was below normal; the greatest monthly amount, 0.90, occurred at Winsors, while none fell at several stations.—*H. B. Hersey.*

New York.—The mean temperature was 26.6°, or 2.7° above normal; the highest was 68°, at Madison Barracks on the 9th, and the lowest, 31° below zero, at Canton on the 2d and at North Lake on the 2d and 3d. The average precipitation was 2.69, or about normal; the greatest monthly amount, 7.41, occurred at Lake George, and the least, 1.03, at Fulton.—*R. M. Hardinge.*

North Carolina.—The mean temperature was 40.0°, or about 3.5° below normal; the highest was 77°, at Fayetteville on the 12th, and the lowest, 5° below zero, at Linnville on the 4th. The average precipitation was 1.03, or about 3.25 below normal; the greatest monthly amount, 3.27, occurred at Wilmington, and the least, 0.37, at Asheville.—*C. F. von Herrmann.*

North Dakota.—The mean temperature was 13.2°, or 5.5° above normal; the highest was 65°, at Jamestown on the 12th, and the lowest, 34° below zero, at Gallatin on the 18th. The average precipitation was 0.47, or 0.20 below normal; the greatest monthly amount, 1.05, occurred at Devils Lake, and the least, 0.05, at Jamestown.—*B. H. Bronson.*

Ohio.—The mean temperature was 30.0°, or very nearly normal; the highest was 72°, at Thurman on the 11th, and the lowest, 20° below zero, at Milligan on the 3d. The average precipitation was 2.32, or about 1.00 below normal; the greatest monthly amount, 4.41, occurred at Hudson, and the least, 0.85, at New Bremen.—*H. W. Richardson.*

Oklahoma.—The mean temperature was 44.3°; the highest was 82°, at Kemp and Mangum on the 25th, and the lowest, 9°, at Clifton and Tahlequah on the 3d. The average precipitation was 2.50; the greatest monthly amount, 6.34, occurred at Fort Reno, and the least, 0.43, at Tahlequah.—*J. I. Widmeyer.*

Oregon.—The mean temperature was 41.5°, or 6.5° above normal; the highest was 72°, at Prineville on the 10th, and the lowest, 6° below zero, at Lorella on the 1st. The average precipitation was 4.61, or 0.59 above normal; the greatest monthly amount, 29.39, occurred at Bay City, and the least, 0.11, at P. Ranch.—*B. S. Pague.*

Pennsylvania.—The mean temperature was 29.4°, or 1.2° above normal; the highest was 72°, at Confluence and Lycippus on the 12th, and the lowest, 16° below zero, at Dushore on the 2d. The average precipitation was 2.23, or 0.98 below normal; the greatest monthly amount, 4.05, occurred at Browers Lock, and the least, 0.96, at Wilkesbarre.—*T. F. Townsend.*

South Carolina.—The mean temperature was 44.5°, or 5.5° below normal; the highest was 78°, at Blackville and Gillisonville on the 13th, and the lowest, 10°, at Cheraw, Clemson College, and Shaws Fork on the 2d, and at Walhalla on the 1st. The average precipitation was 0.86, or 2.86 below normal; the greatest monthly amount, 2.00, occurred at Georgetown, and the least, 0.34, at St. George.—*J. W. Bauer.*

South Dakota.—The mean temperature was 24.0°, or about 9.0° above normal; the highest was 66°, at Plankinton on the 7th, and the lowest, 25° below zero, at Ipswich on the 18th. The average precipitation was 0.29, or about 0.60 below normal; the greatest monthly amount, 0.97, occurred at Silver City, while none fell at Britton, Interior, and Nowlin.—*S. W. Glenn.*

Tennessee.—The mean temperature was 40.6°, or slightly below normal; the highest was 74°, at Dover, Johnsonville, and Pope on the 10th, and the lowest, 10° below zero, at Silverlake on the 3d. The average precipitation was 1.26, or nearly 4.00 below normal; the greatest monthly amount, 2.57, occurred at Rugby, and the least, 0.47, at McMinnville.—*H. C. Bate.*

Texas.—The mean temperature for the State was 1.7° above the normal, which was determined from the departure of 36 stations distributed over the State. The departure was slight in many localities, while there was a marked excess in others. The excess along the immediate coast ranged from 1.5° to 2.5°; in some localities over east Texas it was 3.5°; over southwest Texas, 3.1°; over west Texas, 2.2°; over central and north Texas, 5.2°, and the excess for the month amounted to as much as 7° over the panhandle. The highest was 92°, at Fort Ringgold on the 19th and 28th, and the lowest, 13°, at Estelle on the 3d. The average precipitation for the State, determined by comparison with 38 stations distributed throughout the State, was 0.06 above the normal. There was a general excess over east Texas, the eastern portions of central and north Texas, the east coast district, and in a few other isolated localities, with the greatest excess, 4.33, at Brenham. Over the other portions of the State there was a deficiency, but with a few exceptions the deficit rarely amounted to more than 1.00. The greatest monthly amount, 6.65, occurred at Brenham, while none fell at several stations.—*I. M. Cline.*

Utah.—The mean temperature was 29.1°; the highest was 79°, at St. George on the 14th, and the lowest, 21° below zero, at Fort Duchesne

on the 11th. The average precipitation was 0.47; the greatest monthly amount, 1.62, occurred at Scipio, while none fell at Loa.—*J. H. Smith.*

Virginia.—The mean temperature was 34.3°, or slightly below normal; the highest was 78°, at Barboursville on the 10th, and the lowest, 9° below zero, at Guinea on the 2d. The average precipitation was 0.94, or 3.05 below normal; the greatest monthly amount, 1.85, occurred at Bigstone Gap, and the least, 0.39, at Christiansburg.—*E. A. Evans.*

Washington.—The mean temperature was 41.4°, or about 5.5° above normal; the highest was 69°, at Sunnyside on the 13th, and at Sedro on the 27th, and the lowest, 5°, at Hunters on the 19th. The average precipitation was 5.88, or about 2.00 above normal; in the western portion it was 3.50 above, and in the eastern it was somewhat below normal; the greatest monthly amount, 17.51, occurred at Tatoosh Island, and the least, 0.14, at Sunnyside.—*G. N. Salisbury.*

West Virginia.—The mean temperature was 32.7°, or slightly below normal; the highest was 74°, at Uppertract on the 12th, and the lowest, 13° below zero, at Nuttallburg on the 3d. The average precipitation was 1.84, or about 1.00 below normal; the greatest monthly amount, 3.38, occurred at Huntington, and the least, 0.64, at Uppertract.—*H. L. Ball.*

Wisconsin.—The mean temperature was 20.7°, or 2.7° above normal; the highest was 60°, at North Crandon on the 11th, and the lowest, 27° below zero, at Hayward on the 1st. The average precipitation was 1.52, or 0.36 above normal; the greatest monthly amount, 3.76, occurred at Port Washington, and the least, 0.44, at Medford.—*W. M. Wilson.*

Wyoming.—The mean temperature was 29.0°, or 5.0° above normal: the highest was 65°, at Greenriver on the 15th, and the lowest, 11° below zero, at the same station on the 9th. The average precipitation was 0.29, or 0.32 below normal; the greatest monthly amount, 1.65, occurred at Sheridan, while none fell at Fort Washakie, Greenriver, and Wamsutter.—*W. S. Palmer.*

RIVER AND FLOOD SERVICE.

By PARK MORRILL, Forecast Official, in charge of River and Flood Service.

The flood wave which occurred in the Ohio River during January passed down the lower Mississippi the past month; at the end of the month the river was decidedly lower at all points than at its beginning. The crest passed Cairo on the 1st, Memphis on the 5th, Vicksburg on the 13th, and New Orleans on the 17th. A moderate freshet occurred in the upper Ohio during the latter half of the month, but the Tennessee and Cumberland remained low, and the rise at Cairo was slight. The western tributaries all remained low.

The highest and lowest water, mean stage, and monthly range at 116 river stations are given in the accompanying table. Hydrographs for typical points on seven principal rivers are shown on Chart V. The stations selected for charting are: Keokuk, St. Louis, Cairo, Memphis, and Vicksburg, on the Mississippi; Cincinnati, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.

The following résumé of river stages and conditions of navigation in the respective streams is compiled from reports by the officials of the Weather Bureau at various river stations and section centers:

Hudson River. (Reported by A. F. Sims, Albany, N. Y.)—On the 1st of February the watershed of the Hudson had a covering of snow varying from a trace at the mouth of the river to 20 inches at its source, and the cold wave attendant upon the heavy snow which ushered in the month strengthened the weak spots in the river ice and caused accretions varying from 14 inches at Waterford to 3 inches at Newburg. All ice harvesters took advantage of the situation and pushed the harvest with much vigor. The mild conditions which followed on the 8th and 9th softened the ice and threatened to cause a suspension of the harvest. As a general rule, ice harvesting in February is precarious, and if the ice holds its own during the month it does well, for the reason that the recurring effect of the sun's heat during the day offsets the accretions due to the cold of night.

At 1 p. m. of the 11th the ice in the river began to move southward from the Greenbush bridge, and, after reaching Douws Point, became stationary and piled in the river channel. From the afternoon of the 13th to noon of the 14th the water on the crest of the State dam had risen from 12 to 24 inches; below the State dam, the water was 33 inches above the normal, having risen 19 inches in twenty-four hours. Mill owners and merchants along the river made preparations, as they were in fear of the ice going out above the State dam. On the 14th the ice in the Mohawk was gradually breaking up and there was a clear channel 50 feet wide on the south side of the gorge at Schenectady, and the islands in that district were covered with water. By the 17th the river closed at Troy for the third time this winter, and by 10 a. m. the ferryboats were compelled to cease running. The end of the month finds the ice in the Hudson breaking up at Poughkeepsie, and between Poughkeepsie and Coeymans there are 4 inches of snow on the ice, which is very much watersoaked; from Newburg to New York City the river is open; at Hudson and Catskill the ice is 6 inches thick and very poor; in front of Albany the ice is much honeycombed and a freshet of 4 feet would carry it out. The ice harvest is practically over along the Hudson; only a very limited amount is now being crabbed from behind the dykes. The crop to date is 50 per cent of the average.

Susquehanna River. (Reported by E. R. Demain, Harrisburg, Pa.)—The cold spell beginning the last week in January and continuing several days into February caused a gradual fall in the waters of the Susquehanna river system and a general closing of all streams above Sunbury, as well as the Juniata branch. This was followed by mild weather and a general breaking up of the ice from the 11th to the 13th on a flood of several feet, which reached its maximum height about the middle of the month. Another moderate cold wave on the 16th and 17th caused a second gradual fall and the closing of the streams at a few of the stations on the upper river and a general closing of the Juniata. The general storm of rain and moist snow from the 18th to the 21st was followed by a moderate freshet, which carried out nearly all the ice, except in places where it lodged along the shores and will lie until it melts unless floated out on a flood. The breaking up of the ice was attended by little or no damage to property. The last week of the month was characterized by falling waters in all streams.

The average stage of water for the month exceeded that for the corresponding period last year by about 0.6 foot, although the rainfall in the river basin was only about 61 per cent of the quantity which fell in February, 1897. This increase was due doubtless to the discharge of a larger volume of snow water than occurred last year, and is a condition very gratifying to those interests liable to damage by floods, since thaws at intervals during the winter months render the occurrence of a great flood less probable than when continued low temperatures cause a large accumulation of snow on the watershed, which, when melted by a decided warm period at the opening of spring, attended perhaps by a general and heavy rain, is likely to do serious damage to property of various kinds at many places along the river. At the close of the month but little snow remained, and this was confined principally to wooded tracks and to the north side of mountains. In February, 1897, 15 river stations gave an average stage of 3.3 feet of water and 18 stations an average rainfall of 2.41 inches, while for February, 1898, the average river gauge readings of 18 stations was 3.9 feet and the average rainfall of 17 stations 1.46 inch.

Rivers of the South Atlantic States. (Reported by E. A. Evans, Richmond, Va.; C. F. von Herrman, Raleigh, N. C.; L. N. Jesunofsky, Charleston, S. C.; D. Fisher, Augusta, Ga.; and J. B. Marbury, Atlanta, Ga.)—Although an unusually light February precipitation obtained over the basin of the James River, it did not have an appreciable effect upon the stage of water. This was probably due to the slow melting of the snow which was deposited over the headwaters of the stream on January 30. During the first decade the gauge readings were slightly above zero, but with a falling tendency. On the 15th the lowest stage for the month, —0.1, was reached and maintained until the 21st, when under the influence of moderate amounts of precipitation it again went a little above zero, and remained so until the close of the month. The cold weather of the 1st to 5th caused considerable ice in the upper river, and fairly heavy ice above the falls and near Nine Mile Lock. Some of this broke and moved down on the 8th, entering the rapids and being crushed before reaching navigable water so that no damage was done by it. The shore ice remained stationary and gradually melted. There was sufficient water for milling purposes, and navigation was free throughout the month.

The Roanoke and Cape Fear rivers both maintained uniform stages throughout the month of February, and the fluctuations in the smaller streams were very slight. In fact the river conditions were quite devoid of noteworthy features, except that the continuation of the drought in North Carolina has kept all streams quite low, and much below the average for this month. The rainfall was small, occurring chiefly from the 18th to the 22d, and the State deficiency is about 3 inches. Many wells which had dried up last fall have not yet received a sufficient supply of water. The minimum stage in the Cape Fear, about 2 feet on the gauge at Fayetteville, occurred February 15, after which there was a slight rise. There was barely sufficient water to permit transportation between Wilmington and Fayetteville. River business above tidewater is about suspended on other streams.

The rainfall of the past month in South Carolina was the least of any February of which there is record. At Charleston it was the driest February (rainfall 0.51 inch) in one hundred and sixty years; the next driest, 0.53 inch, having been recorded in the year 1758. The rainfall over the drainage areas of the streams in South Carolina during February, 1897, averaged 7.25 inches; in February, 1898, it averaged only 1.03 inch. Although no rainfall occurred between the 1st and 17th, the streams were at a fairly navigable stage during that period, having received the full drainage from the moderate precipitation during the last decade in January. From the 18th to the 28th there was a slow downward tendency, although all the rainfall for the month occurred during that period. The Great Pedee, above Smiths Mills, was unnavigable the entire month, as likewise the Congaree above Granby Falls. The low condition of the streams throughout the entire month has entailed great loss to the lumber interests of eastern South Carolina. Ninety per cent of the valuable logs and cut timber remains in the swamps and at the sawmills on the upper streams awaiting favorable freshets for booming to the lower streams. Only seven rafts of logs and cut timber were received at Charleston and Georgetown during the month. Lumbermen state that such low-water conditions as those experienced during the past month have not been noted within twenty-three years; there is ordinarily at least one good freshet in February, while during this year none has occurred at all.

The rainfall for February averaged 0.68 of an inch over the upper Savannah basin, which is about 13 per cent of the usual quantity, and the bulk of that which fell occurred during the second decade of the month; this small rainfall kept the river at a stage which varied but slightly from day to day, the entire monthly range reaching but 2 feet, while the mean river was 6.3 feet, making the lowest February average on record at Augusta. In consequence of this marked deficiency the boating interests were somewhat jeopardized, as only partial loadings were carried to points both up and down stream, and from the uncertainty by reason of the shallow river many merchants resorted to rail shipments until the river steamers should be favored with a sufficient stage to enable them to be freighted to their full capacity.

The month was characterized by abnormally dry weather throughout the entire State of Georgia, and, as a consequence, all streams are low. According to records extending back to 1891, the water has not been as low in any other February as during the month just closed. At Reynolds, on the Flint, the water was below the zero point on the gauge on twenty-three days, while the highest point, at Albany on the same stream, was 1.4 foot above zero. The rains during the month were light and occurred at wide intervals, so that the water that fell was immediately absorbed by the ground and had no appreciable influence on the rivers. Many smaller streams, which act as feeders to the larger ones, have entirely dried up, something very uncommon for this season of the year. Considerable loss has been sustained by steamboat men, occasioned by the protracted low water. Shipping of all kinds has to be done by rail, much of which could have been done by steamer had the rivers been higher.

Mobile River and branches. (Reported by F. P. Chaffee, Montgomery, Ala., and W. M. Dudley, Mobile, Ala.)—The rainfall over the watershed of the Alabama and tributaries was generally light and so distributed as to exert but little effect on the rivers of this system, which gradually fell from a height of 10 to 14 feet in the Alabama and Coosa, at the beginning of the month, to scant navigable stages during the last few days; fairly good rains from the 17th to 19th and on the 26th and 27th prevented a still more rapid decline. Boats made regular trips on the Alabama during the entire month, and, owing to the slight variation in river stages, freights were handled at all river landings at comparatively little expense and trouble. Not much timber was handled, owing to insufficient water to float it to the larger rivers. The mean river stages at the several stations averaged decidedly lower than for February of past years.

The month opened with good navigable stages in the Tombigbee and Warrior rivers, and these continued, although there has been a gradual and marked decrease in all river stages since the first of the month, with the stages threateningly low at the close. This condition is of course due to the lack of rainfall to check the falls. While rain fell at intervals during the month, it was at such scattered periods that it made no material change in the river stages, and the total monthly rainfall at the several stations in this district ranged from about 1 to 1.5 inch. The water in the Warrior and upper Tombigbee rivers at the beginning of the month ran rapidly off into the lower Tombigbee, giving stages above the danger line (35 feet) at Demopolis up to and including the 5th, when the fall became sudden and continuous, and there was some apprehension as to difficulty of navigation, owing to the low stages of water in all the rivers.

Ohio River and minor branches. (Reported by F. Ridgway, Pittsburg, Pa.; H. L. Ball, Parkersburg, W. Va.; S. S. Bassler, Cincinnati, Ohio; S. P. Gresham, Louisville, Ky.; and P. H. Smyth, Cairo, Ill.)—The month opened at Pittsburg with a fair packet stage of water, carrying considerable newly made ice. Under the influence of low temperatures during the first few days the Alleghany River for the second, and the Monongahela River for the first time this winter, were closed. This condition was, however, of short duration, the mild weather and moderate rains beginning with the 7th resulting in rises out of both rivers, bringing all of the ice with them, and producing on the 14th a stage of about 16 feet at Pittsburg. Conditions favorable for the movement of packets and heavy towing craft continued during the remainder of the month. The inclement weather and increased stage of water have interfered generally with all river construction work.

During the first week the Ohio from Wheeling to Huntington was heavy with broken and drifting ice, and its smaller tributaries were at times frozen over. Small craft were compelled to tie up, but most of the larger packets made their regular runs. The Ohio and its tributaries in West Virginia and Ohio fell slowly until the 8th or 9th. A change to decidedly warmer weather about that time caused a rapid thaw, and this, with the light and general rains of the following days, brought a slow rise, which culminated about the 15th. A second rise occurred about the 23d. At Parkersburg the first rise brought a stage of 22.1 feet on the 15th; the second, a similar stage on the 23d. After the 9th all the rivers were practically free of ice, excellent boating stages prevailed, and navigation was uninterrupted.

The month of February has come to be regarded as preeminently the month of extreme high water in the Ohio River, and the highest stages on record have occurred in that month. February, 1898, was, however, an exception, and, although an excellent boating stage prevailed throughout the month, there was at no time any apprehension of a troublesome rise. The month began with the first severe cold weather of the season, two successive cold waves, with more or less snowfall, giving a wholesome taste of winter. The river rapidly receded from the high stage of the preceding month until the 10th, when the decline ceased at a stage of 13.3 feet at Cincinnati. From the 11th to the 25th it had a steadily rising tendency, reaching 33.5 feet on the 25th, after which it again steadily fell, with every prospect of getting sufficiently low to carry off a considerable amount of spring rain without causing serious trouble. River business was good throughout the month, and, in illustration of the importance of the Ohio River as a carrier, it may be mentioned that on the 2d the steamer *Iron Age* passed this port with twelve barges, each containing one thousand tons of steel rails. To transport this tow by rail would require four hundred cars, which would make a train more than 3 miles long.

The highest stage of the river at Louisville during February was 17.1 feet, on the 1st, having fallen rapidly to this from a flood stage of 29.8 feet on January 27. The water continued to recede till February 11, when the lowest stage for the month, 6.7 feet, was recorded. A vast quantity of mud was deposited on the levees as the water receded, and it required considerable labor to clean off the landings. A slight rise in the river began on the 12th and continued to the 19th, reaching 11.3 feet. This stage was maintained up to the 25th, when another slight rise occurred. At the close of the month the river was 11.3 feet and falling. The average stage of water for the month was 10.0 feet. Navigation was not interrupted by anything during the month. All conditions in regard to the water and weather were particularly favorable, and, in consequence, all river business was carried on with energy.

At the beginning of the month the Ohio was above the danger line at all points from Evansville to the mouth, but with a falling river. At Evansville the fall continued until the morning of the 14th, the total fall amounting to 29.7 feet. The stage passed below the danger line at 4 p. m. on the 6th, and by the 7th the water had receded from all flooded lowlands in the vicinity, permitting families to move back into their dwellings. During the last half of the month the river rose, except from the 24th to 25th, when it was practically at a stand. At Paducah the fall commencing on the 1st continued until the morning of the 16th, the river declining 32.7 feet during this period. A rise from the upper river, together with a slight rise out of the Cumberland, started the river up on the 16th, and continued it at a rising stage to the end of the month. Navigation to and from nearly all points has been regular and uninterrupted. The Tennessee and Cumberland river boats are all doing good business, and so also are the Evansville regular packets. The Cincinnati and the Memphis and New Orleans boats seem to be taxed to their full capacity.

At Cairo the river fell from 44.3 feet at the beginning of the month to 17.0 feet on the morning of the 16th, passing below the danger line on the 6th. From the 8th to 11th the daily fall averaged very nearly 3.4 feet. A rise out of the Mississippi backed the Ohio up at Cairo on the morning of the 16th, and this rise, together with occasional slight rises out of the upper Ohio and Cumberland, kept the river rising until the night of the 25th. A slight fall set in on the 26th, and continued to the close of the month. Considerable lumber has arrived at Cairo during the month, in fact more lumber has been handled during February than has been the case for any month during the past six months, and the prospects are that March will show an increase over February.

Tennessee and Cumberland Rivers. (Reported by L. M. Pindell, Chattanooga, Tenn., and H. C. Bate, Nashville, Tenn.)—During the entire month boats were able to run on the Tennessee although the river was falling slowly except on the 22d, when a slight rise started in at Chattanooga. The river has been navigable for the past twenty years during the month of February. The highest water recorded in February at Chattanooga was 37.5 feet on the 14th, in 1891. In 1897 the highest water at Chattanooga was 35.1 feet on the 26th, against 7.9 feet this year on the same date. The river remained low at the headwaters

during the month; at Speers Ferry, Va., the river was at a stage of one foot or less the entire month except on the 1st, 22d, and 23d. The rainfall was exceedingly light over the watershed during the month, the amount at Chattanooga being the least recorded in the past twenty years. More snow fell this year in February than in 1897. Five inches fell at Bluff City, N. C., and Speers Ferry, Va., and 6 inches at Tazewell, Tenn. The month closed with the river falling slowly and with conditions favorable for navigation, closing to large boats during the early part of March, when the river will probably be below the 3-foot stage.

The Cumberland River was at good stage but falling rapidly at the opening of the month. It continued falling till about the 12th, and was closed to navigation above Celina for several days at that time. Light rains soon brought it to a navigable stage again, and have held it practically stationary ever since. At the close of the month it is falling slowly and, without immediate rains, will be closed above Carthage by the 5th of March.

Mississippi River and minor branches. (Reported by P. F. Lyons, St. Paul, Minn.; M. J. Wright, Jr., La Crosse, Wis.; F. H. Duff, Davenport, Iowa; F. Z. Gosewisch, Keokuk, Iowa; H. C. Frankenfield, St. Louis, Mo.; P. H. Smyth, Cairo, Ill.; S. C. Emery, Memphis, Tenn.; R. J. Hyatt, Vicksburg, Miss.; and R. E. Kerkam, New Orleans, La.)—There is more snow on the watershed above St. Paul than there was at the end of January, but it hardly averages 4 inches in depth, and hence there need be no fear of a more than ordinary stage of water from that source the coming spring. The rivers remained frozen over all the month, and at its close the ice was strong and firm; by actual measurement it was 18 inches thick at St. Paul, the greatest thickness, 20 inches, being measured on the 7th.

The moderately heavy rains on the 10th had but little effect aside from decreasing for a few days and about 3 inches the thickness of the ice, and increasing to a corresponding degree the stage of the water in the river. It is estimated that a maximum stage of 3.2 feet had attained at St. Paul on the 15th, and a minimum of 2.6 feet on the 28th.

The river in the vicinity of La Crosse was closed during the entire month, the ice ranging in thickness from 13 to 21 inches. The ice harvest was completed about the 20th, which is somewhat earlier than usual, the weather having been favorable for the harvest throughout the season. The present season was one of the best during the past twelve years. An unusually warm period prevailed from the 8th to the 11th, which interfered to some extent with lumbering operations in the Black River country on account of the general thaw which occurred. The outlook for river business the coming season is said to be good, provided there is sufficient water in the spring to drive the logs.

Ice in varying thickness, from 15 to 16 inches, continued in the river at Dubuque during February. Rain and moderately high temperatures softened the surface and shore ice somewhat during the second week, but colder weather hardened it again on the 15th. There were 3 inches of snow on the ground at the close of the month.

At Leclaire, Iowa, about 15 miles above Davenport, the river remained frozen all the month. On the 13th the ice went off the rapids between Leclaire and Davenport, the river becoming open as far as the bridge between Davenport and Rock Island. On the morning of the 14th the water marked 10 feet on the gauge, and the ice piled up considerably opposite the central part of the city, but near the lower end of town it hardly moved at all; after the 14th the water gradually fell. On the 19th floating ice began to fill the open space at the bridge, and on the morning of the 20th this ice was stationary. On the 21st the river was frozen to a point about one-fourth mile above the bridge, and by the morning of the 22d the stationary ice had been added to until the river was frozen three-fourths of a mile from the bridge. By the 25th the river was again frozen for a short distance above the city limits. The river remained frozen all the month from West Davenport to Muscatine, about 28 miles below. At the close of the month the ice was about 18 inches thick opposite West Davenport, while it was not more than 8 or 10 inches in thickness above the bridge.

The ice, which remained solid at the close of January, began breaking on the Des Moines Rapids during the night of the 10th, large fields being loosened by the current, breaking up and packing below. This movement continued during the 11th and 12th, swelling the stage of water to 10 feet. During the night of the 12th the gorges south were broken by the increased pressure of the water released from the north and the channel opened. On the 21st the channel was reported open to Burlington bridge, though the ice remained solid north of that point. At the close of the month the channel remains open to Burlington, while heavy shore ice continues in shallow water. Fluctuation in the river stage between the 13th and 19th was sudden and irregular, caused by the release of volumes of water by the breaking away of masses of ice north. Since the 19th the fall has been steady and the month closes with a stage of 2.2 feet. The liability of the river ice shifting at this point renders it undesirable for ice cutting; the Des Moines Rapids Canal, however, offers a field easy of access and safe.

Owing to the prevailing warm weather during the greater portion of February, the snow and ice farther south melted rapidly, resulting in a steadily rising river at St. Louis until the last week of the month, notwithstanding the fact that the precipitation had been somewhat deficient. At Hannibal the extreme range of the water was over 6 feet, while at St. Louis it was 9 feet. The cold wave which commenced on January 31 continued until February 4, and caused a general re-formation of ice gorges as far south as Hannibal bridge. Below the bridge the river was well filled with floating ice as far south as St. Louis on the 1st, and navigation, both north and south, was entirely suspended on the 2d, with the exception of the ferryboat service at St. Louis. On the 3d a slight gorge prevailed above the St. Louis bridge for a short time, compelling the North Market Street ferryboats to suspend operations for a few hours. On the 4th people were again crossing on the ice at Hannibal, and at St. Louis it was fast on the east shore. On the 7th the river was once more clear at St. Louis. On the 9th the ice disappeared at Grafton and Louisiana and moved slightly at Hannibal, blocking again, however, in a short time. At 7:30 p. m. on the 10th this gorge finally broke and the ice all ran out, leaving the river clear to Quincy. On the 22d and 23d colder weather again caused light ice at all points, but it rapidly disappeared under the influence of higher temperatures which followed.

The Illinois River was practically closed until the 8th, when the ice commenced to move.

Navigation south was fully resumed on the 9th, and on the 11th the steamer *Eileen* arrived from the north for the second time this year. By the 12th navigation northward was fairly opened for the season as far as Clarksville, Mo. On the 14th the steamer *Hill City* departed for New Orleans, being the first through packet to leave St. Louis.

From St. Louis to Cairo the low stage of the river from the 1st to the 9th permitted of navigation in only a light way, but during the remainder of the month a good boating stage was maintained. Light ice, not sufficient to interfere with navigation, passed down the river on the 3d and 8th.

At Cairo there was very little change in the stage during the first week of the month; a steady fall then set in and continued until about the 18th. Combined rises out of the Ohio and upper Mississippi started the lower river up on or about the 19th, and kept it rising during nearly the remainder of the month. At the end of the month conditions were favorable for an early decline.

On February 1 the Mississippi River from Cairo to Memphis was above the danger line, and at Helena it was only about 2 feet below that mark, and rising. The stage at Memphis on February 1 was 33.3 feet, and by February 3 it had increased to 33.6 feet, the maximum stage, where it remained until the 7th, and then a fall set in. For the first two or three days the fall in the river was only moderate, but by the 18th it had become much more rapid, and during the following week the daily decline amounted to 1.5 foot. The lowest stage for the month, 11.9 feet, was reached on February 19, when a further lowering of the water was prevented by a slight swell which had for several days previous, been working its way down the Ohio River. This second rise began at Memphis on February 20, and continued up to the end of the month, the gauge reading at that time being 17.9 feet. The rapidity which marked the subsidence of this flood wave is even more remarkable than its rise. The time intervening between the first rise and the point of decline was twenty-three days, the average daily rise being 1.2 foot. The fall to a normal stage occurred in twelve days, the daily average amounting to 1.8 foot. The total fall amounted to 21.7 feet, 92 per cent of which occurred in eight days.

The movement of the flood wave was as follows: The crest passed Cairo January 31 at a 44.4-foot stage; Memphis, February 5, with 33.6 feet on the gauge; and Helena on February 8, when the river stood at 43.1 feet. At these stages the river was bank-full, and in many places flowed over into the lowlands of Arkansas. Opposite Memphis a considerable area became covered with water, at depths varying from 2 to 6 feet, but no great damage resulted therefrom. After the subsidence of the flood, a good boating stage existed over the whole distance from Cairo to Helena, and business was fully up to the average for this season. Reports from the levee camps are of a very favorable character. The Craghead Point levee is nearly closed, and when this is done the St. Francis levee line will be complete to a point within 30 miles of Memphis. South of Memphis the levee work is progressing satisfactorily, and now that the water has subsided, there is no longer any doubt in regard to the closing of all crevasses before the spring rise.

The rivers south of Memphis were fairly high during the month, with the stage of water above danger line at Vicksburg from the 4th to the 17th. Work on the levees was pushed to meet this stage, and no damage occurred except at the Reid levee, about 6 miles below Vicksburg on the Louisiana side, where the protection levee broke, causing considerable delay in the work on the main line of levee. Navigation and river traffic continued good during the month. Heavy fog was reported along the river at intervals during the month, slightly impeding business. The river bank above Greenville was reported caving and filling the river with foam.

The Mississippi, below Vicksburg, continued rising until the middle of the month, after which a fall began just below Vicksburg and continued to the close of the month. The maximum stage of 15 feet at New Orleans occurred on the 17th.

The Ouachita continued its rapid fall at Camden during the first decade of the month, and during the same period a slight rise continued at and below Monroe. The decline in the lower Ouachita set in about

the middle of the month. There was ample water for purposes of navigation during the month.

Missouri River. (Reported by L. A. Welsh, Omaha, Nebr.; P. Connor, Kansas City, Mo.; and H. C. Frankenfield, St. Louis, Mo.)—From a point above the mouth of the Yellowstone, near the line between North Dakota and Montana, southward to a few miles above Omaha, the Missouri River remained frozen throughout the month. At all points along the upper river the ice is reported to be weak and rotten, and the early breaking up of the ice is generally predicted. On the night of the 24th and 25th the ice in the river at Omaha began to break up and run out. The break first began at a point a little above the Douglas street bridge, and a channel about 300 feet wide was soon opened that extended down the river past the city, becoming much wider below the Union Pacific Railway bridge. By the night of the 27th the river had opened as far north as Florence, Nebr., or about 6 miles above Omaha, and reports received from below Omaha indicate that the ice is running out.

The river at St. Joseph, Mo., was closed until the 13th, when the ice began to break up and run out. At Kansas City floating ice appeared from the 1st to 6th and from the 19th to 24th; otherwise the river was clear. There was a range of 4.3 feet in the stage of the river, the lowest being on the 4th and the highest on the 18th. Nothing of importance transpired along the lower Missouri River during the month. Light floating ice was observed at various times until the 26th, and the stage of water averaged somewhat higher on account of absence of cold weather.

Arkansas River. (Reported by J. J. O'Donnell, Fort Smith, Ark., and F. H. Clarke, Little Rock, Ark.)—The month was exceptionally droughty in the central Arkansas Valley. The result was a steadily falling river until the 12th. However, the heavier rains through Oklahoma and the Canadian Valley caused a rise of 5.5 feet from 5 p. m. of the 12th to 11 a. m. of the 15th, the gauge at Fort Smith then registering 8.1 feet. After remaining stationary for a few hours the river began to fall, and continued steadily falling to the end of the month. Owing to backed water from the Arkansas work on the bridge over the Poteau River, one mile above its mouth, was discontinued for three days. The river gauge to be fixed at Webbers Falls was shipped there on the 15th. The establishment of a gauge at that point will be of very great benefit to navigation from Fort Smith, besides being useful in determining the volume of water that comes from the upper Arkansas and the Grand and Verdigris rivers, as Webbers Falls is 14 miles west of the mouth of the Canadian River. Excepting the first half of the second week navigation was pursued uninterruptedly and advantageously during the month between Fort Smith and all points to Webbers Falls.

The Arkansas River south of Fort Smith declined steadily to February 11, when a slight rise was felt, which was lost on the following day; it then rose steadily for the three following days, reaching its highest stage for the month at Dardanelle on the 17th, and at Little Rock on the 20th. During this rise the river rose 5.1 feet at Fort Smith, 5.3 feet at Dardanelle, and 4.3 feet at Little Rock, the crest of the rise taking two days to travel from Fort Smith to Dardanelle, and four days to reach Little Rock.

A good boating stage was maintained in the river south of Little Rock throughout the month, but it was too low for profitable navigation between Dardanelle and Little Rock from the 9th to 14th and on the 27th and 28th. No ice was reported in the river during the month, nor drift that impeded navigation.

Red River. (Reported by C. Davis, Shreveport, La., and R. E. Kerkam, New Orleans, La.)—Despite the absence of notable precipitation in its watershed, the Red River was characterized by stages amply sufficient for navigation. At Shreveport the month opened with 10.8 feet on the gauge; decreasing stages prevailed until the 17th, when the lowest reading, 5.4 feet, for the month was recorded; the latter part of February was marked by a rise of several feet, followed by a gradual fall at its close.

Heights of rivers above zeros of gauges, February, 1898.

Stations.	Distance to mouth of river.	Danger line on gauge.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Mississippi River.	*Miles*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
St. Paul, Minn. †	1,957	14	.....	.....	.....	.....	.....	.....
Reeds Landing, Minn. †	1,887	12	.....	.....	.....	.....	.....	.....
La Crosse, Wis. †	1,822	10	.....	.....	.....	.....	.....	.....
North McGregor, Iowa †	1,762	18	.....	.....	.....	.....	.....	.....
Dubuque, Iowa †	1,702	15	.....	.....	.....	.....	.....	.....
Leclaire, Iowa †	1,612	10	.....	.....	.....	.....	.....	.....
Davenport, Iowa †	1,596	15	.....	.....	.....	.....	.....	.....
Keokuk, Iowa [a]	1,466	14	9.8	13	2.2	27,28	4.4	7.6
Hannibal, Mo	1,405	17	6.1	18	— 0.1	2	3.1	6.2
Grafton, Ill	1,307	23	9.2	21	3.0	3,4	6.0	6.2
St. Louis, Mo.	1,264	30	12.3	22	3.2	6	7.4	9.1
Chester, Ill.	1,189	30	8.5	23	2.1	7,8	5.1	6.4
Cairo, Ill	1,073	40	44.3	1	17.0	16	27.9	27.3
Memphis, Tenn	843	33	33.6	3-6	11.9	19	22.6	21.7
Helena, Ark	767	44	43.1	7,8	18.8	21,22	32.2	24.3
Arkansas City, Ark.	635	42	43.6	11	24.1	24,25	36.0	19.5
Greenville, Miss	595	40	37.9	11	19.6	25	31.0	18.3
Mississippi River—Cont'd	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Vicksburg, Miss	474	41	43.0	12-14	26.0	28	38.0	17.0
New Orleans, La	108	16	15.0	17	11.1	28	13.8	3.9
Arkansas River.								
Wichita, Kans.	720	10	2.7	12,13	1.4	1-3	2.0	1.3
Fort Smith, Ark.	345	22	7.9	15	2.6	11,12	4.1	5.3
Dardanelle, Ark.	250	21	6.8	17	1.5	12-15	3.0	5.3
Little Rock, Ark.	170	23	8.1	20	3.8	13,15,16	5.4	4.3
White River.								
Newport, Ark	150	26	8.7	1	3.5	21-24	5.0	5.2
Des Moines River.								
Des Moines, Iowa †	150	19	.....	.....	.....	.....	.....	.....
Illinois River.								
Peoria, Ill	135	14	13.2	22-24	6.9	9,10	10.2	6.3
Missouri River.								
Bismarck, N. Dak. †	1,201	14	.....	.....	.....	.....	.....	.....
Pierre, S. Dak. †	1,006	14	.....	.....	.....	.....	.....	.....
Sioux City, Iowa †	676	19	.....	.....	.....	.....	.....	.....
Omaha, Nebr. †	561	18	.....	.....	.....	.....	.....	.....
St. Joseph, Mo.	373	10	2.9	17	0.7	9	1.9	2.2
Kansas City, Mo.	280	21	9.2	18	4.9	4	6.5	4.3
Boonville, Mo.	191	20	8.0	20	3.5	6	6.0	4.5
Hermann, Mo.	95	24	7.5	20	2.6	7	5.0	4.9
Ohio River.								
Pittsburg, Pa	966	22	14.4	14	2.5	4	7.7	11.9
Davis Island Dam, Pa.	960	25	13.5	13	4.3	4	8.8	9.2
Wheeling, W. Va.	875	36	21.4	14	5.8	6	12.2	15.6
Parkersburg, W. Va. [b]	785	35	22.1	15,23	8.0	7-9	14.8	14.1
Point Pleasant, W. Va.	703	36	26.0	24	6.7	8	16.3	19.3
Catlettsburg, Ky	651	50	30.5	24	9.0	8	20.1	21.5
Portsmouth, Ohio	612	50	31.5	24	10.7	9	21.7	20.8
Cincinnati, Ohio	499	45	36.9	1	13.3	10,11	25.0	23.6
Louisville, Ky.	367	24	17.1	1	6.7	11	10.0	10.4
Evansville, Ind	184	30	41.4	1	11.7	14	23.5	29.7
Paducah, Ky.	47	40	43.7	1	11.0	16	23.2	32.7
Alleghany River.								
Warren, Pa	177	7	8.2	13	1.8	9,10	3.5	6.4
Oil City, Pa	123	13	10.2	13	2.3	5,6,8,9	4.2	7.9
Parkers Landing, Pa.	73	20	13.0	13	2.5	6-8	4.8	10.5
Freeport, Pa.	26	20	16.1	13	3.8	7	8.5	12.3
Conemaugh River.								
Johnstown, Pa.	64	7	3.6	12	1.7	6-8	2.5	1.9
Red Bank Creek.								
Brookville, Pa.	35	8	2.5	13	0.7	7-11,28	12.2	1.8
Beaver River.								
Ellwood Junction, Pa.	10	14	6.9	13	1.7	27-28	3.2	5.2
Cumberland River.								
Burnside, Ky	434	50	7.0	14	2.8	10,11	4.5	4.2
Carthage, Tenn.	257	30	9.3	1	3.7	11	5.2	5.6
Nashville, Tenn	175	40	19.2	1	5.8	12-14	8.2	11.0
Great Kanawha River.								
Charleston, W. Va.	61	30	7.9	22	3.0	4-6	5.3	4.9
New River.								
Hinton, W. Va.	95	14	3.2	22	1.3	4,5	2.1	1.9
Licking River.								
Falmouth, Ky.	30	25	9.0	21	2.2	11	4.0	6.8
Miami River.								
Dayton, Ohio	69	18	4.3	21	1.9	8	2.8	2.4
Monongahela River.								
Weston, W. Va	161	18	5.0	2	0.4	28	1.9	4.6
Fairmont, W. Va	119	25	7.8	21	1.2	8	3.2	6.6
Greensboro, Pa. [c]	81	18	13.0	22	8.2	1,27,28	9.2	4.8
Lock No. 4, Pa.	40	28	16.6	22	7.3	5	10.1	9.3
Cheat River.								
Rowlesburg, W. Va. [d]	36	14	6.0	19,21	2.9	10,11	4.5	3.1
Youghiogheny River.								
Confluence, Pa.	59	10	5.8	12	1.5	28	2.9	4.3
West Newton, Pa. [d]	15	25	5.8	11	1.6	28	3.2	4.2
Muskingum River.								
Zanesville, Ohio	70	20	17.3	22	8.0	4	12.0	9.3
Tennessee River.								
Knoxville, Tenn.	614	29	3.8	1	1.7	19,20,28	2.4	2.1
Kingston, Tenn	534	25	3.7	1	1.2	27,28	1.8	2.5
Chattanooga, Tenn.	430	33	7.9	1	3.2	21,22	4.2	4.7
Bridgeport, Ala	390	24	6.8	1	1.8	20-24	2.7	5.0
Florence, Ala.	230	16	10.3	1	1.9	25-26	3.5	8.4
Johnsonville, Tenn.	94	21	23.8	1	3.4	27	7.6	20.4
Clinch River.								
Speers Ferry, Va.	156	20	1.8	22	0.2	17,19	0.6	1.6
Clinton, Tenn	46	25	7.0	1	4.1	12,13	5.0	2.9
Wabash River.								
Mount Carmel, Ill.	50	15	21.9	1	6.9	12,13	10.8	15.0
Red River.								
Arthur City, Tex.	688	27	8.7	17	3.0	4,5	4.8	5.7
Fulton, Ark	565	28	10.4	18	3.6	10	6.2	6.8
Shreveport, La.	449	29	10.8	1	5.4	16,17	7.1	5.4
Alexandria, La	139	33	16.9	1	10.8	18	13.0	6.1
Atchafalaya Bayou.								
Melville, La	100*	31	32.2	17,18	28.0	28	31.1	4.2
Ouachita River.								
Camden, Ark.	340	39	25.3	1	9.5	28	13.4	15.8
Monroe, La	100	40	35.9	12,13	32.3	28	34.8	3.6
Yazoo River.								
Yazoo City, Miss.	80	25	23.8	16-18	21.2	28	22.9	2.6
Chattahoochee River.								
Columbus, Ga.	140	20	2.5	1	0.5	17,27,28	1.0	2.0
Flint River.								
Albany, Ga.	80	20	2.3	23	1.4	17	1.8	0.9
Cape Fear River.								
Fayetteville, N. C.	100	38	6.0	23	2.2	15	4.1	3.8
Columbia River.								
Umatilla, Oreg	270	25	10.3	17	2.5	3-6	5.4	7.8
The Dalles, Oreg.	166	40	16.5	18	2.5	2	8.1	14.0

Heights of rivers above zeros of gauges—Continued.

Heights of rivers above zeros of gauges—Continued.

Stations.	Distance to mouth of river.	Danger line on gauge.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Willamette River.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Albany, Oreg	99	20	10.3	8	4.0	1,2	7.0	6.3
Portland, Oreg	10	15	11.3	19	2.4	2	8.2	8.9
Edisto River.								
Edisto, S. C	75	6	3.5	1,2	2.3	16	2.8	1.2
James River.								
Lynchburg, Va.[a]	257	18	1.5	1,23	0.4	17-19	0.8	1.1
Richmond, Va	110	12	0.7	1	— 0.1	15-21	0.2	0.8
Alabama River.								
Montgomery, Ala	265	35	10.5	1	1.2	26,27	2.7	9.3
Selma, Ala	212	35	14.8	1	1.4	25-27	3.6	13.4
Coosa River.								
Rome, Ga	225	30	3.6	1	1.2	17-28	1.7	2.4
Gadsden, Ala	144	18	5.5	1	0.6	27,28	1.8	4.9
Tombigbee River.								
Columbus, Miss	285	33	13.2	1	— 0.9	16,17	1.6	14.1
Demopolis, Ala	155	35	46.0	1	4.9	28	16.7	41.1
Black Warrior River.								
Tuscaloosa, Ala	90	38	21.7	1	3.6	26,27	7.4	18.1
Pedee River.								
Cheraw, S. C	145	27	2.9	22,23	0.9	17,18	1.6	2.0
Black River.								
Kingstree, S. C	60	12	3.7	2,3,8,9	3.0	26-28	3.4	0.7
Lumber River.								
Fairbluff, N. C	10	6	2.5	4	0.9	18,19	1.7	1.6
Lynch Creek.								
Effingham, S. C	35	12	6.9	3	3.5	17,18	4.5	3.4

Heights of rivers above zeros of gauges—Continued.

Stations.	Distance to mouth of river.	Danger line on gauge.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Potomac River.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Harpers Ferry, W. Va	170	16	5.7	22	2.0	8,9	2.6	3.7
Roanoke River.								
Clarksville, Va	155	12	..	....	.....	.....	.....	.....
Sacramento River.								
Redbluff, Cal	241	23	12.0	28	0.4	1-3	3.7	11.6
Sacramento, Cal	70	25	15.8	9,26,27	9.3	1	13.2	6.5
Santee River.								
St. Stephens, S. C	50	12	7.4	2-4	1.3	18-20	3.5	6.1
Congaree River.								
Columbia, S. C	37	15	1.5	1,2,21-24	1.0	26	1.3	0.5
Wateree River.								
Camden, S. C	45	24	5.6	1	3.0	27,28	3.8	2.6
Savannah River.								
Augusta, Ga	130	32	7.8	1	5.8	27	6.3	2.0
Susquehanna River.								
Wilkesbarre, Pa	178	14	11.0	13	4.0	18,28	7.8	7.0
Harrisburg, Pa	70	17	7.8	24	2.7	4-7	4.9	5.1
Juniata River.								
Huntingdon, Pa.[f]	80	24	5.2	12-14	4.0	4,26-28	4.5	1.2
W. Br. of Susquehanna.								
Williamsport, Pa	35	20	8.4	13	2.1	4	4.4	6.3
Waccamaw River.								
Conway, S. C	40	7	2.1	24,25	1.0	18,19	1.5	1.1

† Frozen entire month. [a] Record for 16 days. [b] Record for 26 days. [c] Record for 27 days. [d] Record for 20 days. [e] Record for 24 days. [f] Record for 17 days.

SPECIAL CONTRIBUTIONS.

THE SEARCH LIGHT FOR WEATHER SIGNALS.

By EDGAR B. CALVERT.

The recent sinking of the battleship *Maine* in the harbor of Habana recalls to the minds of many Weather Bureau officials the first experiments made by the Government on an elaborate scale for the purpose of demonstrating the availability and value of a search light in disseminating warnings of frost, cold waves, and storms. In the early part of February, 1895, by courtesy of the Navy Department, the search light for the battleship *Maine*, then nearing completion, was loaned to the Department of Agriculture for temporary use at the Chicago office of the Weather Bureau. The Secretary of Agriculture asked the Navy Department for the loan of the instrument at the suggestion of Col. H. H. C. Dunwoody, at that time Assistant Chief of the Weather Bureau. The experiments were conducted by the present Chief of the Weather Bureau, who was then in charge of the Chicago office. The apparatus was erected on the coping of the Auditorium building at an elevation of 270 feet above street level. Its lens was 30 inches in diameter, and its electric light was estimated at about 100,000 candle power.

After some experimentation the following code was adopted:

Revolving beam of white light: Cold-wave or frost.

Revolving beam of red light: Marine storm with high easterly winds.

Revolving beam of red and white (pencil of light half and half each color): Marine storm with high westerly winds.

The white light was adopted for both cold wave and frost, because no confusion in the meaning of the signal was anticipated, as it would always mean frost in the early spring, after vegetation had started, and in the early fall, before a killing frost had occurred. It was found that the red light had a penetrating power a little less than 60 per cent of that of the white light.

The instrument was installed and the necessary electric connections made about February 15, 1895, but an opportunity for a practical demonstration of the value of the search light as a means of giving warning of impending meteorological conditions did not occur until the evening of February 28, 1895. At that time forecasts for the northwestern States were made at Chicago. The morning charts of that date indicated the possibility of a cold wave for Chicago and vicinity, preceded by high northwest gales; but the conditions were not sufficiently marked to warrant the issuing of cold-wave and storm warnings. Special observations were called for from stations in the region of the cold wave to the west. These reports were received at the Chicago office and charted about 1 o'clock in the afternoon, and from them it became apparent that the cold wave would reach that city by the following morning. After the forecast was prepared it was too late for the information to be published in the afternoon papers, as they go to press about 2 p. m. The search light had to be depended upon to give immediate warning of the coming cold.

The temperature during the afternoon of February 28 reached a maximum of 62°, and by the afternoon of the next day there was a fall of 42°, fully justifying the prediction.

The conditions were peculiarly favorable for a successful trial, the night being dark and cloudy. Shortly after the last rays of twilight had faded away the search light was adjusted, and the electric current turned on. A great beam of intensely white light pierced the blackness of the night. The machine was slowly revolved at the rate of one revolution in five minutes, and for about one and one-half hours the light was flashed over the city. To those stationed on the tower of the building the beam appeared intensely bright. It seemed to rest on the dense cloud of smoke that almost continually envelops the city. Its effect was striking and beautiful.

The press of the city had been notified in the late afternoon that a practical test would be made, and several editors had stationed observers in the various suburbs of the city at distances of 10 to 30 miles from the Weather Bureau office to watch for the light. From these observers and other persons it was ascertained that the signal was clearly seen at a distance of 20 miles. It was impossible to make an estimate of the number of persons who observed the light and understood its meaning, but as nearly 2,500,000 people reside in the district within a radius of 25 miles from the Auditorium building, the number must have been considerable, especially in view of the fact that the local press had on several occasions previous to this trial given notice of the presence of the search light in the city and explained its contemplated use. Many

ignorant people were thoroughly frightened by the regular flash of the signal light around the city when told that it presaged the coming of a storm.

A more thorough trial of the efficiency of the light in disseminating marine storm signals could not be made, as navigation on Lake Michigan did not open until April 10, and the instrument had to be returned to the Navy Department shortly after that date. But few boats leave Chicago before the opening of navigation, and the owners of these can be warned of approaching storms almost invariably by telephone.

An opportunity did not occur for sending actual warnings, except under the favorable conditions of a cloudy sky; but during the course of several experimental trials it was demonstrated that the penetrating power of the light was 20 to 30 per cent less on a clear night than on a dark, cloudy night. If the moon was shining brightly the range of efficiency was still further diminished. When the sky was clear and there was no moon the natural light from the stars, augmented by the constant glow from the lights of a great city, materially reduced the distance at which the flash could be seen. A slight amount of dust or haze is of course essential, as the beam will be invisible in absolutely pure air.

No test of the efficiency of the search light in the presence of dense fog was made. This was unfortunate, but it is not thought that the flash could be seen at any considerable distance with sufficient distinctness to be understood. A red light could hardly pierce a fog to any material distance.

In the first experiments the light was revolved once a minute, but this was soon found to be entirely too fast, as the flash passed an observer 20 miles away at the rate of 125 miles per minute. A 5-minute revolution was then adopted, but even this was perhaps too fast for good results, as a person in a suburb 20 miles from the Auditorium would barely glimpse the light, or its shadow, as it went by him at a speed of about 25 miles per minute.

Several interesting suggestions were made during the course of the Chicago experiments, none of which seemed entirely practicable. The most ingenious of these was that the prediction be placed in letters about three inches in height on the lens of the search light, as for instance, "Cold wave tonight," and be thrown in glaring letters upon the clouds. This scheme, if at all feasible, would probably not prove by any means effective at a greater distance than 1 mile, but a direct trial was not made.

The present methods of distributing forecasts and warnings are effective and comparatively inexpensive. The Chicago experiments proved that search lights are not useful for this purpose except under the most favorable conditions. At present the great cost of construction, maintenance, and operation of the search lights would preclude their adoption by the Weather Bureau, even if they had been shown to be practicable under all conditions. However, it may be that at some future time the cost of the search lights will be so much reduced and their operation so simplified as to warrant their use by the Weather Bureau, in large cities and at important seaports, for the purpose of immediately disseminating general forecasts and warnings made from the evening charts.

METEOROLOGICAL OBSERVATIONS AT PORT AU PRINCE, HAYTI.

Through the kind cooperation of Prof. T. Scherer of Port au Prince, Hayti, the meteorological observations taken by him at 7 a. m., local time, or 11:49 a. m., Greenwich time, are communicated in manuscript for early publication in the MONTHLY WEATHER REVIEW. By entering these on the monthly and annual charts, published by the Weather Bureau, we obtain an important extension southeastward of our field of study. The observations are taken 1h 11m earlier than those of the Weather Bureau telegraph system. The original reports are in metric measures; the conversions are by the Editor.

The barometer is 119 feet above sea level; its readings have been corrected by Professor Scherer for temperature, elevation, and gravity, this latter correction is —0.064 inch; the thermometers are 6.7 feet above ground; the rain gauge, 7.2 feet above ground.

The position of Port au Prince, Hayti, is latitude 18° 34′ N., longitude 72° 21′ W., or 4h 49m west of Greenwich. Additional records for this station are published in the annual volume of the Central Meteorological Institute at Vienna.

Observations at Port au Prince, Hayti.

JANUARY, 1898.

Date.	Barometer reduced.	Temperature. Air.	Temperature. Dew-point.	Rel. humidity.	Wind. Direction.	Wind. Velocity.	Clouds. Kind.	Clouds. Amount.	Clouds. Direction.	Preceding 24 hours. Total rain.	Preceding 24 hours. Temperature. Max.	Preceding 24 hours. Temperature. Min.
	Inches	°	°	%						*Inch.*	°	°
1	30.02	72.1	67.5	86	.....	0	k	3	se.	0.19	85.1	70.9
2	30.12	73.8	71.6	93	e.	2	k	10	n.	0.23	76.6	71.6
3	30.17	70.2	58.3	63	se.	11	k	9	ne.	.....	78.3	69.3
4	30.10	69.4	57.7	68	se.	11	s	1	.....	.....	83.7	68.4
5	30.03	69.8	62.6	79	se.	4	.....	0	.....	.....	83.3	66.6
6	30.05	69.8	64.6	84	ese.	2	k	0	.....	.....	87.6	68.5
7	30.11	70.2	66.9	90	se.	2	cs,k	1	w.	0.17	88.5	68.2
8	30.08	73.9	68.2	83	ese.	9	k	1	.....	.....	89.4	70.9
9	30.07	73.4	62.6	70	ese.	7	s	1	.....	.....	89.1	72.1
10	30.10	71.8	61.2	71	e.	9	.....	0	.....	.....	86.9	69.3
11	30.08	71.8	57.9	67	e.	13	....	0	.. ..	.....	88.9	66.7
12	30.10	72.1	62.1	76	e.	2	.....	0	.....	.....	87.3	68.2
13	30.06	72.0	62.9	74	ese.	11	.....	0	.....	.....	87.4	68.4
14	30.04	70.9	61.3	74	e.	9	.....	0	.....	.....	88.9	70.0
15	30.06	72.3	60.6	68	e.	11	.....	0	.....	.....	89.8	70.3
16	30.04	68.5	64.8	89	.....	0	.....	0	.....	.....	89.2	68.4
17	30.02	68.2	62.1	82	ese.	2	cs	0	w.	.....	89.6	66.9
18	30.04	75.0	56.1	54	ese.	11	cs	1	w.	.....	89.4	70.0
19	30.07	73.6	61.7	67	ese.	13	cs	7	sw., wsw.	.....	88.7	72.0
20	30.07	72.0	57.4	62	e.	9	cs	1	.....	.....	88.7	66.6
21	30.10	72.9	58.6	63	ese.	11	.....	0	.....	.....	92.5	68.4
22	30.06	72.5	62.6	73	e.	7	.....	0	.....	.....	90.5	70.2
23	30.11	85.3	57.4	72	se.	7	.....	0	.....	.....	87.8	65.7
24	30.10	73.0	61.2	68	se.	13	.....	0	.....	.....	90.5	72.3
25	30.06	72.0	61.0	70	e.	11	....	0	.....	.....	88.5	70.5
26	30.06	69.1	61.3	78	ese.	2	.....	1	....	.....	84.7	67.6
27	30.08	72.7	59.7	66	ese.	9	k	1	se.	.....	87.1	71.4
28	30.10	73.4	60.6	66	e.	9	k	2	.....	.....	88.9	71.8
29	30.10	71.4	64.0	79	se.	2	k	6	ne.	.....	85.6	69.8
30	30.10	68.2	63.0	84	se.	4	ks	1	.....	.....	88.7	67.5
31	30.09	67.5	60.1	79	ese.	2	....	0	.....	.....	88.2	66.4
Sum	.....	.....	.....	.....	.....	.....	.....	...	....	0.59	.....	.....
Means.	30.08	71.2	61.9	74	.....	7	.....	1.5	.....	.....	86.7	69.8

FEBRUARY, 1898.

1	30.06	72.0	61.2	70	ene.	4	.....	0	.....	.....	87.4	70.5
2	30.06	71.2	61.3	73	e.	2	k	1	.....	. ....	90.0	69.8
3	30.11	69.3	63.5	83	.....	0	.....	0	.....	0.06	87.4	67.5
4	30.09	67.8	64.6	90	ese.	4	s	1	.....	.....	86.7	66.9
5	30.06	69.4	65.8	89	ene.	2	cs	1	wnw.	.....	86.5	68.5
6	30.02	68.5	66.7	94	.....	0	s	1	.....	0.04	84.6	68.4
7	30.06	70.9	64.8	81	e.	11	k	10	w.	.....	83.8	68.0
8	30.09	71.1	59.4	68	ese.	13	k	1	n.	.....	84.7	69.1
9	30.07	68.7	53.6	61	e.	11	ak	1	sw.	.....	85.5	66.7
10	30.05	70.2	52.0	54	e.	13	.....	0	.....	.....	88.7	67.8
11	30.09	70.0	56.7	64	e.	13	.....	0	.....	.....	87.1	68.0
12	30.11	70.0	52.9	56	ese.	7	.....	0	.....	.....	89.4	69.1
13	30.08	69.6	57.9	68	e.	4	k	8	nnw.	.....	86.7	68.4
14	30.07	71.4	57.9	64	e.	11	ck, k	6	w.	.....	87.4	69.8
15	30.06	70.7	56.8	63	e.	2	k	2	nw.	.....	88.2	69.8
16	30.06	70.9	56.8	62	e.	2	k	4	n.	.....	92.5	68.0
17	30.06	67.6	58.6	64	.....	0	.....	0	.....	.....	87.8	67.1
18	30.06	71.8	58.6	65	se.	2	k	1	ene.	.....	88.5	70.2
19	30.02	68.2	63.5	81	e.	2	.....	0	.....	.....	89.8	67.6
20	30.01	68.5	66.6	83	.....	0	.. ..	0	.....	0.08	87.4	67.5
21	30.00	70.9	70.0	92	.....	0	k	5	ne.	0.49	86.0	68.4
22	29.98	66.2	64.2	94	se.	2	.....	0	.....	.....	85.3	64.8
23	30.00	68.7	62.4	82	.....	0	k	1	.....	0.89	88.0	66.9
24	30.04	69.8	66.2	89	.....	0	k	7	ne.	0.20	88.0	66.0
25	30.03	66.7	63.7	85	.....	0	ck	2	.....	0.38	85.1	64.9
26	30.02	69.8	63.5	82	ese.	4	ck	7	wsw.	.....	86.0	67.5
27	30.00	69.8	62.1	77	ese.	2	.....	1	....	0.02	85.1	67.1
28	29.94	69.3	67.8	85	e.	4	.....	0	... .	0.53	85.8	67.8
Sum	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.69	.....	.....
Means.	30.04	69.6	61.2	76.1	.....	4.3	.....	.....	.....	.....	87.3	68.7

CLIMATOLOGICAL DATA FOR JAMAICA, W. I.

Through the kindness of Mr. Maxwell Hall, of Montego Bay, Jamaica, the meteorological service of that colony communicates an abstract of the very interesting climatological records of that highly important West Indian service. The climatological summary furnished by Mr. Hall, through his assistant, Mr. Robert Johnstone, of the Meteorological Office, is reproduced in the following table. For descriptive details of the stations and instruments see Vol. XXV, pages 308 and 356.

Montego Bay, where Mr. Maxwell Hall resides, is between 4 and 5 miles west, and also the same distance north of Kempshot Observatory. The location of the latter is N. 18° 24′ 50″, W. 77° 52′ 22″. Stony Hill Reformatory is about 8 miles north of Kingston and within a mile to the west. Hope Gardens is between 3 and 4 miles to the north of Kingston, and about the same distance to the east. From these measurements the latitudes and longitudes given in the following table have been deduced:

Climatological data for Jamaica, W. I.

FEBRUARY, 1898.

	Morant Point Lighthouse.	Negril Point Lighthouse.	Kingston.	Montego Bay.	Castleton Gardens.	Hope Gardens.	Stony Hill Reformatory.	Hill Gardns (Ch. Planet.)
Latitude	17°56′	18° 16′	17° 58′	18° 30′	18° 12′	18° 02′	18° 06′	18°05′
Longitude	76°10′	78° 23′	76° 48′	77° 57′	76° 50′	76° 46′	76° 49′	76°39′
Elevation (feet)	8	33	50	160	580	600	1,400	4,907
Mean barometer 7 a. m.	29.961	29.971	29.970	29.969	29.911	.....	.....	25.279
Mean barometer 3 p. m.	29.912	29.921	29.907	29.921	29.923	.....	.....	25.245
Mean temperature 7 a. m.	.....	71.1	68.2	67.9	64.8	65.1	65.0	55.9
Mean temperature 3 p. m.	.....	80.8	82.2	79.7	77.2	80.3	76.5	61.6
Mean of maxima	.....	83.5	84.8	82.0	81.8	86.8	81.8	64.9
Mean of minima	.....	68.0	66.4	64.7	60.6	61.4	61.9	52.8
Highest maximum	.....	87	87.3	85.1	85	94	85	74
Lowest minimum	.....	63	63.2	57.4	55	58	59	50
Mean dew-point 7 a. m.	.....	66.8	62.2	65.1	60.9	60.7	62.1	51.9
Mean dew-point 3 p. m.	.....	69.0	67.1	66.3	69.7	69.5	71.5	57.6
Mean relative humidity 7 a. m.	.....	87	81	93	86	87	90	85
Mean relative humidity 3 p. m.	.....	68	61	65	74	71	85	85
Monthly rainfall (inches)	2.74	0.79	2.66	1.68	1.44	2.72	2.52	4.51
Average daily wind movement	.....	204.4	36.3	77.0	.....	.....	.....	18.9
Average wind direction 7 a. m.	nne.	ne.	n.	ene.	.....	.....	.....	e.
Average wind direction 3 p. m.	*	n. by e	se.	ene.	.....	.....	.....	e.
Average hourly velocity 7 a. m.	6.9	9.2	2.1	1.6	.....	.....	.....	.....
Average hourly velocity 3 p. m.	8.5	12.7	4.3	5.0	.....	.....	.....	.....
Average cloudiness (tenths):								
7 a. m. Lower clouds	2.5	1.1	0.3	1.4	.....	.....	.....	.....
7 a. m. Middle clouds	1.4	2.8	0.9	0.9	.....	.....	.....	.....
7 a. m. Upper clouds	0.7	0.1	1.1	0.0	.....	.....	.....	.....
3 p. m. Lower clouds	3.2	3.5	2.6	0.5	.....	.....	.....	.....
3 p. m. Middle clouds	1.7	2.1	1.4	2.4	.....	.....	.....	.....
3 p. m. Upper clouds	0.8	0.2	1.0	0.2	.....	.....	.....	....

*ne. by n.

DECEMBER, 1897.

Mean barometer 7 a. m.	29.955	29.965	29.965	29.961	29.626	.....	.....	25.365
Mean barometer 3 p. m.	29.902	29.901	29.893	29.896	29.600	.....	.....	25.338
Mean temperature 7 a. m.	80.0	72.4	71.1	70.9	69.	[illegible]3	69.1	59.4
Mean temperature 3 p. m.	82.5	83.0	85.0	81.2	80.	[illegible]3	78.0	64.4
Mean of maxima	.....	86.1	88.6	83.5	83.5	[illegible]3	84.5	68.5
Mean of minima	.....	69.0	69.7	68.4	64.4	[illegible]3	64.8	55.8
Highest maximum	.....	90	91.3	86.0	87	90	87	72
Lowest minimum	.....	64	67.7	63.6	60	62	62	52
Mean dew-point 7 a. m.	.....	69.3	65.7	69.0	67.2	64.4	65.7	54.9
Mean dew-point 3 p. m.	.....	71.2	68.5	71.7	72.1	71.3	73.3	59.8
Mean relative humidity 7 a. m.	.....	89	83	94	85	87	89	82
Mean relative humidity 3 p. m.	.....	67	58	74	71	65	86	84
Monthly rainfall (inches)	3.42	1.99	0.09	3.37	7.75	0.75	2.90	6.63
Average daily wind movement	.....	222.9	41.1	81.3	.....	.....	.....	50.9
Average wind direction 7 a. m.	ne.	ne.	n.	e.	.....	.....	.....	e.
Average wind direction 3 p. m.	ne.	*	sse.	ene.	.....	.....	.....	e.
Average hourly velocity 7 a. m.	7.6	8.8	1.4	1.8	.....	.....	.....	.....
Average hourly velocity 3 p. m.	10.2	13.4	2.7	5.1	.....	.....	.....	.....
Average cloudiness (tenths):								
7 a. m. Lower clouds	2.0	1.6	0.2	1.8	.....	.....	.....	.....
7 a. m. Middle clouds	2.0	1.5	0.9	0.1	.....	.....	.....	.....
7 a. m. Upper clouds	0.9	0.2	1.3	0.3	.....	.....	.....	.....
3 p. m. Lower clouds	1.8	4.0	1.8	1.1	.....	.....	.....	.....
3 p. m. Middle clouds	1.7	1.9	1.6	1.5	.....	.....	.....	.....
3 p. m. Upper clouds	0.7	0.5	1.1	0.0	.....	.....	.....	.....

*ne. by n.

OBSERVATIONS AT HABANA, CUBA.

Through the kindness of the Director of the Belen Observatory, Rev. L. Gangoiti, the observations made at that station at 1 p. m., Greenwich mean time, or 8 a. m., seventy-fifth meridian time, are communicated to the Weather Bureau promptly by mail, and are herewith published for general use. The position of the observatory is N. 23° 8′ 14″, W. 76° 9′ 42″, from San Fernando, or 69° 57′ west from Greenwich; altitude of the barometer 24.347 meters (79.7 feet); the barometric readings have been reduced to sea level and converted into English measures by the Director. The correction for local gravity has not been applied; so far as it concerns latitude, the correction for 30 inches of mercury is —0.054 inch. The clouds are observed with much minuteness; two kinds are frequently recorded under the general heading of "upper" or "lower"; in these cases the two kinds are printed in the accompanying table in the same column but separated by a semicolon; their respective directions are also separated by a semicolon. The rainfall is given for the twenty-four hours ending with 1 p. m., Greenwich time. Most of these observations seem to be read off from the records of the Secchi meteorograph, but the directions of the clouds have apparently been observed accurately by the use of the reflecting nephoscope. The kinds of clouds are indicated in the accompanying table, by the same letters as those used in the original manuscript, which undoubtedly agree with the following paragraph quoted from the annual volume published by the same observatory:

The clouds are classified as upper and lower; among the upper clouds the following are included, arranging them in the order of decreasing altitude from above downward, viz: *c*, cirrus; *ck*, cirro-cumulus; *cs*, cirro-stratus; *ka*, alto-cumulus. Among the lower clouds the following are included: *kb*, lower cumulus; *sk*, strato-cumulus; *s*, stratus, and *n*, nimbus. The false cirrus is not included; the lower cirro-cumulus is included with the alto-cumulus and the cumulo-nimbus is included with the strato-cumulus.

Meteorological data, Habana, Cuba, February, 1898.

Date.	Barometer reduced to sea level.	Temperature of air.	Relative humidity.	Wind. Direction.	Wind. Velocity.	Upper clouds. Kind.	Upper clouds. Am't.	Upper clouds. Direction.	Lower clouds. Kind.	Lower clouds. Am't.	Lower clouds. Direction.	Total rainfall.
	Inches	°	%		*Miles*							*Inch*
1....	30.08	70.2	80	n.	13	.....	0	.....	sk.; s.	10	n.	0.77
2....	30.18	62.8	73	n.	11	.....	0	.....	k.; sk., s.	8	ese.; ene.	0.01
3 ...	30.27	64.6	64	nw.	12	.....	0	.....	k.; sk.	3	nw.	0.00
4....	30.25	64.8	81	nnw.	20	.....	.....	.....	k.; sk., s.	10	se.; nne.	0.00
5....	30.15	66.6	86	e.	1	.....	0	.....	k.; sk.	2	ne.	0.26
6....	30.13	68.4	73	w.	11	k.	4	nnw.	k.; sk.	2	n.; nnw.	0.22
7 ...	30.18	63.5	60	nne.	5	.....	0	.....	k.	1	ne.	0.00
8....	30.19	62.1	74	ese.	0.5	.....	0	.....	k.; sk.	4	ene.	0.00
9....	30.16	64.0	86	e.	1	.....	0	.....	sk.	F.	.....	0.01
10....	30.12	68.4	79	e.	13	k.	1	e.	sk.	F.	.....	0.00
11....	30.17	66.7	85	e.	8	.....	0	.....	sk.	F.	.....	0.00
12....	30.20	64.8	84	ese.	1	k.	2	ene.	sk.	F.	.....	0.00
13....	30.18	62.8	82	.....	0	k.	2	ne.	k.; sk.	F.	....	0.00
14....	30.13	64.2	83	.....	0	.....	0	.....	sk.	F.	.....	0.00
15....	30.05	67.8	80	ese.	4	k.	F.	wsw.	.....	0	.....	0.00
16....	30.08	67.3	91	sse.	1	k.	1	w.	k.; sk.	4	ne.; ene.	0.03
17....	30.09	69.3	78	e.	10	cs.; k.	1	w.; s.	k.	F.	.....	0.00
18....	30.09	69.3	83	e.	7	.....	0	.....	.....	0	.....	0.00
19....	30.03	68.9	85	se.	2	k.	F.	se.	sk.	F.	.....	0.00
20....	30.05	69.6	91	.....	0	k.	F.	nw.	k.	1	nw.	0.00
21....	30.02	70.3	86	.....	0	cs.; k.	3	wsw.	k.; sk.	5	nw.; sw.	0.01
22....	30.05	66.7	56	nnw.	13	k.	1	wnw.	k.	2	nw.	0.13
23....	30.09	62.8	64	nnw.	4	c.; cs.	4	w.	k.; sk.	2	ne.	0.00
24....	30.15	67.1	61	n.	9	k.	F.	nnw.	k.	2	nne.	0.00
25....	30.13	70.0	70	n.	18	k.	F.	nnw.	sk.; s.	6	nne.; ne.	0.00
26....	30.16	63.5	77	ne.	1	k.	F.	.....	k.; sk.	1	nne.	0.51
27....	30.12	63.7	76	.....	0	k.	F.	nw.	k.; sk.	F.	.....	0.00
28....	29.98	63.3	82	e.	2	k.	7	wnw.	k.; sk.	F.	....	0.00
Sum	.....	.....	....	.....	.....	.....	....	.....	.....	....	.....	1.97

MEXICAN CLIMATOLOGICAL DATA.

Through the kind cooperation of Señor Mariano Bárcena, Director, and Señor José Zendejas, vice-director, of the Central Meteorologico-Magnetic Observatory, the monthly summaries of Mexican data are now communicated in manuscript, in advance of their publication in the *Boletin Mensual;* an abstract translated into English measures is here given in continuation of the similar tables published in the MONTHLY WEATHER

REVIEW during 1896. The barometric means have not been reduced to standard gravity, but this correction will be given at some future date when the pressures are published on our Chart IV.

Mexican data for February, 1898.

Stations.	Altitude.	Mean barometer.	Temperature. Max.	Min.	Mean.	Relative humidity.	Precipitation.	Prevailing direction. Wind.	Cloud.
	Feet.	*Inch.*	° *F.*	° *F.*	° *F.*	%	*Inch.*		
Aguas Calientes	6,106	23.94	72.5	39.7	58.1	50	0.00	s.	w.
Arteaga (Coahuila)	.....	.....	86.5	39.4	60.4	.....	1.14	.....	.....
Barousse (Coahuila)	5,414	.....	77.5	41.0	57.7	.....	0.11	.....	.....
Colima (Sem.)	.....	.....	.....	.....	74.8	.. ...	.....	.....	.....
Leon	5,934	24.30	77.2	37.4	57.6	47	0.67	sse.	wsw.
Linares (N. Leon)	1,188	28.83	91.0	36.5	65.1	70	0.91	se.	s.
Magdalena (Sonora)	4,948	.....	.....	.....	59.2	.....	0.00	w.	ne.
Mazatlan (Sinaloa)	25	29.96	75.9	56.7	68.0	79	0.00	nw.	sw.
Merida (Yucatan)	50	30.01	94.6	54.0	73.2	64	0.74	ne.	se.
Mexico (Obs. Cent.)	7,472	23.06	73.4	40.1	55.6	54	0.45	nw.	w.
Morelia (Seminario)	6,401	23.96	76.8	39.9	59.9	60	0.30	sw.	w.
Oaxaca	5,764	25.09	83.5	43.0	64.8	54	0.35	nw.	sw.
Parros (Coahuila)	3,986	.... ..	77.9	42.1	60.3	.....	0.28	.....	.....
Rosario (Sinaloa)	.....	.....	83.3	53.2	66.0	.. ...	0.00	sw.	e.
Saltillo (Col. S. Juan)	5,399	24.76	76.3	37.0	54.1	65	0.67	s.	sw.
Silao (Guanajuato)	6,063	24.32	72.9	45.3	60.4	58	0.95	w.	w.
Torreon (Coahuila)	3,720	.. ....	80.2	46.8	62.1	.....	0.16	.....	.....
Tuxpan	.....	.....	93.6	52.9	70.0	81	5.57	se.	n.
Vaqueria	.....	.....	77.5	29.3	57.6	.....	T.	.....	.....
Tuxtla (Gutierrez)	1,864	28.16	96.8	51.4	72.1	63	0.19	.....	.....
Zapotlan (Seminario)	5,078	.....	80.6	43.0	65.1	54	1.00	sse.	sw.

OBSERVATIONS AT HONOLULU, REPUBLIC OF HAWAII.

Through the kind cooperation of Mr. Curtis J. Lyons, Meteorologist to the Government Survey, a copy of the daily record at Honolulu is communicated to the Weather Bureau in advance of its official publication, and is herewith printed, as a special contribution, for the convenience of those who are studying the relations of the storms and weather of the United States to those of adjacent countries, with a view to long-range, seasonal predictions.

Meteorological observations at Honolulu, Republic of Hawaii.

Pressure is corrected for temperature and reduced to sea level, but the gravity correction, —0.06, is still to be applied.

The average direction and force of the wind and the average cloudiness for the whole day are given unless they have varied more than usual, in which case the extremes are given. The scale of wind force is 0 to 10. Two directions of wind, or values of wind force, connected by a dash, indicate change from one to the other.

The rainfall for twenty-four hours is given as measured at 6 a. m. on the respective dates.

FEBRUARY, 1898.

February, 1897.	Pressure at sea level. 6 a. m.	3 p. m.	9 p. m.	Temperature. 6 a. m.	2 p. m.	9 p. m.	Maximum.	Minimum.	Relative humidity. 6 a. m.	2 p. m.	9 p. m.	Wind. Direction.	Force.	Cloudiness.	Rain measured at 6 a. m.
	Ins.	*Ins.*	*Ins.*	°	°	°	°	°	%	%	%				*Ins.*
1.	29.94	29.88	29.97	67	76	70	79	66	....	70	86	s.	2	7-3	0.16
2.	29.93	29.87	29.94	69	73	74	78	67	....	82	86	s.-w.	2	9	0.01
3.	29.94	29.93	30.00	69	73	69	76	69	....	82	76	w.-ne.	1	7	0.76
4.	30.02	29.95	30.12	60	76	69	77	60	....	66	76	ne.	1	3	0.00
5.	30.07	30.05	30.10	62	77	68	78	60	....	59	69	ne.-sw.	1	0-1	0.00
6.	30.10	30.04	30.11	66	78	68	79	63	....	71	85	ne.-w-s.	1	4	0.00
7.	30.11	30.05	30.08	64	78	70	79	63	....	71	81	w.-s.	1	3	0.00
8.	30.09	30.02	30.09	64	78	69	78	63	....	60	80	nne.-sw.	1	1	0.00
9.	30.11	30.06	30.06	63	77	70	77	64	....	74	81	se.-sw.	2	7	0.00
10.	30.07	29.95	30.01	65	76	70	77	69	....	70	77	sw.	2	4-1	0.00
11.	29.96	29.85	29.86	69	73	74	73	64	....	86	78	s.	4	9	0.00
12.	29.87	29.87	29.90	64	70	68	77	62	....	81	81	w, s.	1	10	1.75
13.	29.94	29.90	29.98	63	75	67	75	57	....	70	76	w, n.	2	3-8	0.17
14.	29.89	29.82	29.86	59	75	64	73	55	....	62	79	nw.	2	5	0.00
15.	29.82	29.75	29.82	56	67	62	72	57	....	85	84	n.	1	1-10	0.00
16.	29.84	29.81	29.90	60	68	64	76	63	....	90	95	s.-w.	2	9	0.23
17.	29.90	29.85	29.90	65	75	69	75	65	....	74	82	s.	2	5	2.77
18.	29.92	29.92	29.99	67	74	69	72	67	....	80	86	s.	1	10-6	0.34
19.	29.98	29.92	29.98	67	72	68	78	64	....	82	81	ne.	1	10-4	0.12
20.	29.98	29.95	30.02	67	73	70	78	66	....	78	86	ne.	1	2-5	0.04
21.	30.00	29.93	30.00	68	77	68	75	64	....	71	90	s.	1	4	0.11
22.	29.99	29.88	29.93	65	74	66	78	63	....	70	85	*	1	10-5	0.18
23.	29.96	29.92	29.99	64	74	70	77	66	....	82	86	w.-ne.	1	2-10	0.12
24.	29.98	29.95	29.99	68	75	72	74	68	....	62	74	ene.	3	4	1.60
25.	29.99	29.96	30.04	69	72	69	74	65	....	82	76	ne.	3	9	0.03
26.	29.99	29.90	29.96	65	73	63	75	56	..	59	69	nne.	4	1	0.10
27.	29.90	29.81	29.90	58	73	67	72	54	....	70	66	nw.	3	3	0.00
28.	29.96	29.90	30.00	54	72	65	....	....	....	55	65	n.-ne.	2	2	0.00
	29.97	29.52	29.98	64.2	74.1	68.3	76.0	63.0	....	73.0	79.9	... .	1.8	5	8.49

Mean temperature: 6+2+9÷3 is 68.9°; extreme temperatures 79° and 54°.
* nw.-s.-ene.

METEOROLOGICAL OBSERVATIONS AT RIVAS, NICARAGUA.

The records contributed for many years by Dr. Earl Flint, at Rivas, Nicaragua, include barometric readings. His present station is at 11° 26′ N., 85° 47′ W. The observations at 7:17 a. m., local time are simultaneous with Greenwich 1 p. m. The altitude of his barometer is 36 meters above sea level, but until the barometer has been compared with a standard it seems hardly necessary to publish the daily readings. The wind force is recorded on the Beaufort scale, 0–12. When cloudiness is less than $\frac{1}{16}$, the letter F = few is recorded.

On his forms for December Mr. Flint states that the total annual rainfall for 1897 was 123.43 inches, or the greatest during the eighteen years of his observations.

His station is situated on the western shore of Lake Nicaragua, not far from the eastern end of the western division of the Nicaragua Canal. The volcano Ometepe, on an island in Lake Nicaragua, is about 10 miles northeast of his station. Mr. Flint's records occasionally mention the presence of clouds in the early morning on the summits of this mountain.

Observations at Rivas, Nicaragua.

DECEMBER, 1897.

Date.	Observations at 8 a. m. Temperature. Air.	Dew-point.	Wind. Direction.	Force.	Clouds. Kind.	Amount.	Direction from.	Observations at 8 p. m. Temperature. Air.	Dew-point.	Wind. Direction.	Force.	Clouds. Kind.	Amount.	Direction from.	Rainfall at 8 a. m.
	°	°						°	°						
1	75	69	ne.	2	.....	0	.....	79	75	ne.	2	ks	1	ne.	0.00
2	76	72	ne.	2	s	10	ne.	77	73	e.	2	c	1	e.	0.34
3	75	73	ne.	1	c / ks	9	ne.	77	73	ne.	0	ck	2	ne.	0.00
4	75	73	ne.	1	ck	5	ne	78	72	ne.	2	k	F.	ne.	0.00
5	75.5	70	ne.	3	.....	0	.....	78	72	ne.	2	c	F.	ne.	0.00
6	75	73	ne.	2	.....	0	.....	78	74	se.	1	ks	7	se.	0.00
7	76	72	ne.	1	ks	F.	ne.	77	73	se.	1	ks	F.	se.	0.00
8	76	71	ne.	1	k	F.	ne.	78	72	se.	2	ck	9	se.	0.00
9	76	71	ne.	2	ck	10	ne.	78	72	se.	1	ck	5	se.	0.25
10	76	70	ne.	1	c	0	.....	78	72	se.	1	ck	10	se.	0.00
11	77	73	ne.	1	ks	10	ne.	78	72	se.	1	ck	5	se.	0.00
12	76	71	ne.	3	ks	F.	ne.	79	73	se.	1	c	F.	se.	0.00
13	75.5	70	ne.	2	ks	F.	ne.	79	73	se.	0	.....	0	....	0.00
14	75.5	70	ne.	0	ck / ks	6	sw. / ne.	81	75	e.	1	.....	0	....	0.00
15	7	71	ne.	3	.....	0	.....	77	73	se.	1	k	10	se.	0.23
16	76	72	ne.	2	ck	3	ne.	79	73	ne.	3	.....	0	....	0.00
17	77	73	ne.	3	ck / ks	2	se. / ne.	79	73	ne.	3	.....	0	....	0.00
18	76	70	ne.	3	.....	0	.....	78	71	ne.	2	.....	0	....	0.00
19	76	71	se.	0	ks	5	se.	78	77	ne.	1	.....	0	....	0.00
20	76	72	ne.	0	ks	8	ne.	78	74	se.	1	.....	0	....	0.00
21	76.5	72	ne.	1	ks	1	ne.	79	73	ne.	1	.....	0	....	0.00
22	77	73	ne.	2	ks	10	ne.	79	73	ne.	1	ks	5	ne.	0.00
23	77	73	ne.	2	ck	9	ne.	77	73	e.	1	ks	10	e.	0.00
24	75.5	71	ne.	2	ck / ks	5	..... / ne.	78	72	ne.	3	.....	0	....	0.46
25	76	71	ne.	3	.....	0	.....	78	72	ne.	2	.....	0	....	0.00
26	77	70	ne.	3	ck	5	se.	79	73	ne.	2	.....	0	....	0.00
27	77	73	ne.	2	c	1	se.	80	73	ne.	2	ck	2	ne.	0.00
28	78	72	ne.	2	ck	5	ne.	79	73	ne.	1	ck	1	ne.	0.00
29	78	70	ne.	3	ck	8	ne.	79	73	ne.	3	c	2	ne.	0.00
30	76	67	ne.	3	ck	2	ne.	76	70	ne.	3	c	1	ne.	0.00
31	76	67	ne.	2	c, ck	2	ne.	77	73	ne.	2	c	F.	ne.	0.00
Means	76.1	....	.....	...	.....	3.7	.....	78.0	....	.....	...	.....	2.3	....	1.28

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1	76.5	70	ne.	3	ks	10	ne.	77	70	ne.	3	ck	9	ne.	0.00
2	73	62	ne.	2	c, cs	8	se.	74	63	ne.	3-4	c	10	ne.	0.00
3	71.5	52	ne.	3	cs, / ks	9	sw. / ne.	74.5	63	ne.	3-4	ck	5	ne.	0.00
4	71	58	ne.	3	c, ck	2	sw. / ne.	74	63	ne.	2	c	F.	ne.	0.00
5	72	63	ne.	2	ck	F.	ne.	78	71	ne.	2	ck	10	ne.	0.00
6	74	68	ne.	2	ck	5	ne.	77	70	ne.	2	ks	F.	ne.	0.00
7	74	68	ne.	2	ks	F.	ne.	80	72	ne.	1	c	F.	ne.	0.00
8	75	68	ne.	2	ck	1	ne.	78	72	ne.	2	c	F.	ne.	0.00
9	79	73	ne.	1	ks	4	ne.	78	72	se.	1	ks	F.	se.	0.00
10	75.5	73	ne.	1	ks	8	ne.	77	71	se.	1	.....	0	....	0.00
11	76	71	e.	2	ks	1	e.	77	71	se.	1	ks	10	se.	0.12
12	75.5	73	ne.	1	ks	6	ne.	77.5	72	e.	2	ks	5	e.	0.00
13	75.5	73	ne.	2	ks	3	ne.	78	72	e.	2	.....	0	....	0.00
14	75	68	se.	1	.....	0	.....	79	72	se.	0	.....	0	....	0.00
15	75	68	se.	2	ks	10	se.	78	73	se.	2	.....	0	....	0.00
16	76.5	73	se.	2	ks	10	se.	77	71	se.	2	.....	0	....	0.00

Observations at Rivas, Nicaragua—Continued.

JANUARY—*Continued.*

Date.	Observations at 8 a. m.							Observations at 8 p. m.							Rainfall at 8 a. m.
	Temperature.		Wind.		Clouds.			Temperature.		Wind.		Clouds.			
	Air.	Dew-point.	Direction.	Force.	Kind.	Amount.	Direction from.	Air.	Dew-point.	Direction.	Force.	Kind.	Amount.	Direction from.	
	°	°						°	°						
17	75	70	ne.	2	ks	F.	ne.	76	71	se.	2	.....	F.	se.	0.15
18	75	70	ne.	2-3	{ck, ks}	5	{sw. ne.}	77	70	se.	2	.....	0	.....	0.00
19	76	71	e.	1	ks	10	e.	80	74	se.	0	.....	0	.....	0.00
20	76	72	ne.	1	c	F.	ne.	78	72	se.	2	.....	0	.....	0.00
21	76	70	e.	2	ck	5	e.	78.5	73	e.	2	.....	0	.....	0.00
22	76	72	se.	1	ks	1	se.	79	73	e.	2	.....	0	.....	0.00
23	76	71	se.	2	cs	2	sw.	78.5	71	se.	2	ks	2	se.	0.00
24	78	71	se.	2	n	10	se.	77	71	se.	2	ks	5	se.	0.18
25	75.5	73	se.	2	ks	2	se.	78	72	se.	2	ks	10	se.	0.00
26	76	73	ne.	1	ks	10	ne.	76.5	72	se.	2-3	ks	10	se.	0.62
27	74	68	e.	4	.....	0	.....	72	69	se.	2-3	.....	0	.	0.00
28	75	68	e.	2-3	ks	2	e.	77	72	se.	2	c	3	se.	0.00
29	75	68	e.	2-4	ks	4	e.	78	70	e.	3	.....	0	.....	0.00
30	74	68	ne.	1	ks	F.	ne.	76.5	69	e.	2	c	F.	e.	0.00
31	75	68	se.	2	c, ks	F.	se.	78	71	e.	2	ck	5	se.	0.00
Means	75.0	....	.....	...	.....	4.1	.....	77.2	....	.....	...	.....	2.7	.....	1.07

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1	75.5	68	se.	2	ck.	3	se.	77	70	se.	3	ck.	5	se.	0.00
2	75	66	se.	3	ck.	2	se.	77	70	se.	1	ck.	3	se.	0.00
3	75	69	ne.	1	ck.	1	ne.	76	69	se.	2	c.	1	se.	0.00
4	74	67	e.	3	c., ck.	1	e.	75	69	se.	2	c.	2	se.	0.00
5	73	64	e.	2	ck.	10	e.	77	70	se.	1	ck.	5	se.	0.00
6	73	66	e.	1	.....	0	.....	78	71	e.	1	.....	0	.....	0.00
7	74	65	se.	1	.....	0	.....	78	72	e.	2	ck.	F.	e.	0.00
8	73	66	se.	1	....	0	.....	77	70	se.	1	ck.	5	se.	0.00
9	74	67	se.	1	ks.	4	se.	.....	....	e.	2	ks.	10	e.	0.00
10	75	72	se.	1	ks.	10	se.	78	72	se.	2	ks.	3	se.	0.00
11	75	71	e.	1	ks.	5	e.	79	72	e.	1	.....	0	.....	0.00
12	75	69	ne.	1	c.	1	ne.	79	72	ne.	2	ks.	3	?	0.00
13	75	68	ne.	1	ck.	2	ne.	78	70	se.	1	.. ....	0	.....	0.00
14	74	68	ne.	2-3	ks.	1	ne.	78	69	e.	2	.....	0	.....	0.00
15	75	69	e.	1	ks.	2	e.	78	70	se.	2	.....	0	.....	0.00
16	74.5	66	e.	2	ks.	1	e.	77	70	e.	2	.....	0	.....	0.00
17	75	69	ne.	2	ks.	F.	ne.	78	70	ne.	2	.....	F.	?	0.00
18	76	69	ne.	2	ks.	2	ne.	79	72	ne.	2	.....	0	.....	0.00
19	76	73	ne.	1	ks.	10	ne.	78	72	ne.	2	.....	0	.....	0.12
20	75	69	ne.	1	.....	0	.....	78	72	ne.	1	.....	0	.....	0.00
21	75	72	ne.	1	ck.	2	ne.	78	72	ne.	2	.....	0	.....	0.00
22	75	67	ne.	1	ks.	F.	ne.	78	72	ne.	2	.....	0	.....	0.00
23	75	69	ne.	2	ks.	1	ne.	79	69	e.	2	.....	0	.....	0.00
24	74.5	68	ne.	2	ks.	F.	ne.	79	72	e.	2	.....	0	.....	0.00
25	75.5	68	ne.	2	ks.	F.	ne.	76	69	ne.	2-3	.....	0	.....	0.00
26	74	67	ne.	2-3	ck.	1	ne.	77	70	ne.	2	c.	F.	ne.	0.00
27	74	68	ne.	1	c.	F.	se.	77	71	e.	1	ck.	1	e.	0.00
28	74	65	e.	1	ck.	2	e.	77	70	e.	1	c.	1	e.	0.00
Means	74.6	....	.....	...	.....	2.2	.....	77.0	....	.....	...	.....	1.5	.....	0.12

Mr. Flint notes that on February 12 the cirro-stratus clouds covering the entire sky in the afternoon were arranged in parallel bands, all converging toward the vanishing points in the northwest and southeast, a phenomenon that he had never previously observed.

THE MAURITIUS CYCLONE OF DECEMBER 5, 1897.[1]

By T. F. Claxton, Director Royal Alfred Observatory (dated December 29, 1897).

The center of a cyclone passed over Mauritius between 10 and 11 p. m. on Sunday, December 5.

Photographs from meteorological self-registers at the Royal Alfred Observatory of Mauritius during the passage of the cyclone of December 4–6, 1897, are shown on Chart X.

From observations received from different parts of the island it would appear that the center of the calm area approached from north by west, and traveled south by east.

More damage was done in the eastern districts than elsewhere.

[1] The Editor regrets that by reason of some difficulty encountered in reproducing the diagram of curves communicated by Mr. Claxton, this article could not appear in the Monthly Weather Review for December.

At the observatory the center passed a little to the eastward. A lull occurred suddenly at 9:54, the wind being from east-southeast. No change in the direction occurred till 9:58, when the wind rapidly backed to south-southwest, then to north-northwest one-half west, veered suddenly to south-southwest, and then backed again to west-southwest and west by north.

After the lull at 10:10 the wind came in puffs from south-southwest, increasing in force till the wind reached west by south (10:45 p. m.).

The following table shows the movements of the barometer, wind, etc., from 4 d. 9 h. to 6 d. 9 h.:

Day and hour, local mean civil time.	Barometer.		Wind.		Temperature.		Relative humidity.
	Corrected and reduced to sea level.	Rise (+) or fall (−) per hour, corrected for variation.	Mean direction.	Velocity, miles per hour.	Of the air.	Of evaporation (wet bulb).	
1897. d. h. m.	*Inches.*				°	°	%
Saturday, Dec. 4, 9	29.922	.....	e. by s.	19.0	83.1	75.0	63.7
17	29.834	−0.004	e. ¼ n.	18.0	79.5	75.2	79.0
23	29.873	−0.003	e. by n.	14.4	78.1	74.2	79.6
Sunday, Dec. 5, 4	29.805	−0.004	e.	21.0	77.4	74.0	82.0
8	29.816	−0.007	e.	23.0	78.4	75.6	85.0
9	29.807	−0.011	e.	22.7	80.0	75.9	79.5
10	29.795	−0.007	e.	27.2	80.5	76.1	78.5
11	29.780	−0.009	e.	30.6	81.8	76.2	73.6
Noon	29.756	−0.011	e.	29.9	81.8	76.0	72.8
13	29.728	−0.016	e.	28.8	81.0	75.9	75.6
14	29.700	−0.015	e.	34.2	78.1	75.3	85.0
15	29.671	−0.019	e.	31.3	77.2	75.0	88.0
16	29.639	−0.029	e. by n.	30.7	77.4	74.2	83.0
17	29.617	−0.031	e. ¼ n.	38.3	75.9	71.5	77.9
18	29.580	−0.052	e. ¼ n.	45.7	75.9	72.2	80.5
19	29.511	−0.087	e.	58.3	74.1	72.1	89.0
20	29.385	−0.139	ese.	61.5	.....	.....	.....
21	29.196	−0.199	ese.	71.0	.....	.....	.....
21 13	28.996	−0.435	e. by s.	[82.0]	.....	.....	.....
21 40	28.924	−0.414	ese.	[40.0]	.....	.....	.....
21 58	28.966	.....	ese.	[14.0]	.....	.....	.....
22	28.969	+0.063	s. by w.	[14.0]	.....	.....	.....
22 15	29.003	.....	s.	[12.0]	.....	.....	.....
22 23	28.992	.....	w. by n.	[35.0]	.....	.....	.....
22 45	29.010	.....	w. by s.	[56.0]	.....	.....	.....
23	29.234	+0.368	w. ¼ s.	[50.0]	.....	.....	.....
Monday, Dec. 6, 0	29.451	+0.232	w. by n.	25.0	.....	.....	.....
1	29.564	+0.127	w. by n. ¼ n.	25.5	.....	.....	.....
2	29.644	+0.093	wnw.	26.0	.....	.....	.....
3	29.707	+0.068	nw. by w.	27.0	.....	.....	.....
4	29.741	+0.035	nw. by w.	27.0	.....	.....	.....
5	29.795	+0.046	wnw.	26.0	74.3	73.0	92.5
6	29.842	+0.033	nw. ¼ w.	27.5	75.4	74.2	93.2
7	29.872	+0.018	nnw.	30.0	75.9	74.6	93.1
8	.....	.....	nnw. ¼ n.	30.5	76.8	75.3	91.8
9	.....	.....	n. by w.	31.0	77.5	75.8	90.5

Note.—The values in brackets are the smoothed values derived from measurements made every 3¼ minutes.

At 5 d. 19.5 hours the photographic lamp of the dry-bulb thermometer was extinguished by the wind.

From the above table it will be seen that no remarkable fall in the barometer took place till Sunday afternoon. At 3:20 p. m. the following telegram was dispatched: "The wind will probably increase during the night, but no immediate danger."

Soon after 5 p. m. an accident happened to the observatory telegraph wire, and as in 1892, so now communication was cut off, however the following warning was issued and conveyed by hand to the Pamplemousses railway station:

6 p. m.—"Center of depression to north-northwest; conditions more unfavorable; precautions are necessary; will telegraph at 7 p. m."

7 p. m.—"The barometer is falling at an accelerated rate; the velocity of the wind will probably increase if the wind veers to northeast before midnight."

8 p. m.—"The center is approaching, but will pass to the eastward if the wind continues to back at its present rate."

As the center of the depression was to the west of north, the slight veering of the wind at 4 p. m., and the accelerated fall of the barometer were considered most unfavorable after a persistent east wind for seven hours. Shortly before 8

p. m. a decided backing set in, and it was thought that, although the center was not more than 30 or 40 miles to the northward, it might pass to the eastward, but the backing did not continue. The barometer continued to fall at an accelerated rate, and at 9:13 p. m. was falling at the rate of 0.435 inch per hour. As already stated, the center of the calm area passed a little to the eastward of the observatory.

[To be continued.]

NOTES BY THE EDITOR.

CIVIL SERVICE EXAMINATIONS.

As the Weather Bureau desires to stimulate the study of meteorology in the schools and colleges, so as to disseminate rational methods of studying the weather map and the atmosphere, so, on the other hand, it needs to secure for its own service employees whose knowledge of the sciences warrants the expectation that they will individually exert a healthy influence in favor of the highest progress in every branch of the service. Parallel with the steady progress that is being made throughout this country in teaching all branches of natural science, there has also been a steady progress in the requirements for entrance into the service of the Weather Bureau. During the years 1870 to 1886 the elementary common school education was required before enlistment, and the special training in meteorological duties was acquired either at the school of instruction or at the regular stations. After 1880 a special effort was made to secure young college graduates or students, and many such men entered the service. In 1881 four gentlemen (Upton, Waldo, Hazen, and Russell) were added to the civil list, at salaries slightly above those of observers. They were graduates of long standing and had already distinguished themselves by activity in work bearing on the duties of the Bureau; they were accepted on the strength of their records, without special examination, as in the case of the full professors, Lapham, Abbe, Maury, Ferrel, and Mendenhall. In 1884, after the resignation of Mr. Upton, his place was filled by the help of the first civil service examination with which the Weather Bureau had to do, and one of the first of so high a grade that had as yet been established by the Civil Service Commission. Several of our best scientific men entered into this examination; one of these, Prof. R. S. Woodward, would undoubtedly have received the appointment had he not in the meantime been far more handsomely provided for by the United States Geological Survey; but his interest in meteorology as a part of the study of the whole earth has led him to the publication of several mathematical papers of importance to our science. At present, as the head of the Department of Mechanics in the school of pure science in Columbia University, New York City, he is doing much to turn the attention of young men toward investigations in meteorology. As the result of this examination, General Hazen selected Prof. C. F. Marvin to fill the vacancy, and his excellent record abundantly justifies the civil service method of making such appointments. During 1888–1895 the position of "meteorological clerk" was filled by competitive examination. Professor Bigelow was appointed in 1891 on his record, but since that date there has been no appointment and no promotion except by examination. Professor Moore, in 1894, and Professor Garriott, in 1895, were appointed after long competitive examinations.

From 1886 to 1893, in the absence of any special school of instruction, it was the custom to at first assign those who entered the service to instruction under the older observers in charge of the respective stations. In the latter year all the positions in the Weather Bureau were placed within the classified service; since this date, therefore, it has been necessary to arrange a system of examinations for those who desire the position of "Weather Bureau observer" or the higher scientific and technical positions up to anything below the grade of Chief or Assistant Chief of Bureau. This principle of examination applies uniformly throughout all the bureaus and divisions of the Department of Agriculture, and, for that matter, throughout the other branches of the departmental service. In his Instructions No. 85, November 11, 1897, Professor Moore commended a course of study in English, arithmetic, algebra, trigonometry, physics, astronomy, and botany to those observers who desire to receive higher rating as to efficiency. The great variety of work that falls to the duty of the employees of the Weather Bureau demands corresponding versatility, adaptability, and energy.

The last "Manual of examinations for the classified Civil Service, Form 302, January, 1898," gives full details as to the examinations for observers and assistants, on pages 50 and 32, respectively. It appears from a table on page 22 that during the fiscal year ending June 30, 1895, there were 44 examined for the position of observer, of whom 28 passed to the list of eligibles and 2 were selected to fill vacancies at $840 per annum; during the fiscal year ended June 30, 1896, 34 were examined, 22 passed and 1 was appointed; during the fiscal year ended June 30, 1897, 37 were examined, 23 passed and 6 were appointed; in October, 1897, the fall examinations were held, and 20 have since been appointed. A number of appointments will probably be made in the Weather Bureau when the results of the spring examination are known.

At the present time preparations are being made for two examinations to be held on Monday, April 25; one of these is to establish a new list of eligibles for the position of "Observer, Weather Bureau," the other for that of "Assistant in the Department of Agriculture." The examination for observer is outlined in section 91 of the above-mentioned manual and will embrace the following subjects with the respective weights: Spelling, 5; arithmetic, 5; letter-writing, 5; penmanship, 5; copying from plain copy, 5; copying from a rough draft, 5; practical questions in meteorology, 40; an essay on a practical subject in meteorology, 20; geography of the United States, 10; total, 100.

The examination for assistant in the Department of Agriculture will embrace three subjects, scientific or technical, bearing directly upon the work of the particular bureau or division of the Department. Thus, for one entering the Weather Bureau the applicant must be examined in meteorology as a major, but in physical geography of the United States and general physics as the two minors. Beside these certain other subjects are considered as electives, such as the languages, Latin, French, German, Italian, or Spanish. The whole list of subjects and the corresponding relative weights is as follows: Orthography, 1.5; arithmetic, 2.5; letter-writing, 2.5; penmanship, 1.5; copying, 2; general training and experience (namely, the applicant's past record), 5; English composition, 5; major examination in one special scientific or technical subject, 50; minor examinations in two required subjects, both together, 20; minor examinations in additional electives, 10; total, 100.

This "Manual of examinations" gives on pages 27 and 50 some questions illustrating the character of past examinations for the position of observer. A copy of the manual can be had gratuitously by direct application to the United States Civil Service Commission. A new schedule of dates for the

fall examinations which occur in the months of September and October will be furnished on request after July 15. Those who desire to take the spring examinations for observer in the Weather Bureau should apply before April 15 to the Civil Service Commission for a copy of the general application blank, Form 304.

The Editor sees no reason why the public high schools and State colleges throughout the land should not make it their duty to teach enough science and modern languages to enable their graduates to pass these and the other examinations that are prescribed by the Civil Service before one can fill the higher positions in the Governmental service. The National Government has a right to look to those colleges, universities, and scientific schools *that have been founded or fostered by its benevolence* to provide the education needed by those who have to prosecute its work.

As a university is a collection of colleges and faculties under one general organization, so our national "University of the United States" must be nothing less than this collection of fifty or sixty State institutions that have directly or indirectly received aid from the National Government. If the intellectual and educational status of these so-called State institutions were to be submitted to the general oversight of the proper federal officer, in order to bring them all up to the required standard, as is now done with regard to the financial status of the Agricultural experiment stations, we should soon realize one of the ideals that so many have been looking for.

PROMOTION FOR MERIT.

That the Honorable the Secretary of Agriculture heartily approves of the efforts of the Chief of the Weather Bureau to maintain the service in a high state of efficiency is in no way more thoroughly shown than by his recent letter announcing that "preferment in this Bureau will be made only in recognition of merit and special fitness." The letter was printed in full for the use of Weather Bureau officials in Instructions No. 18 of 1898; but the following paragraphs seem worthy of reproduction in the MONTHLY WEATHER REVIEW:

Often the saving of hundreds of lives and the protection to millions of dollars' worth of property depend upon the alertness, scientific training, and executive ability of both subordinates and controlling officials of the Weather Bureau. When efficiently officered, this service is of such utility to the commerce and industry of the country that I wish it to be distinctly understood that preferment in this important Bureau of the Department of Agriculture will be made only in recognition of merit and special fitness. In this way, and in this way only, can the Department meet the demands that are made upon the weather service and maintain the high standard required of its officials. The Department is frequently annoyed and embarrassed by letters and petitions from extraneous sources, as in your case, which are inspired by employees seeking advancement to positions which they may not be qualified to fill or to which other employees of greater ability are more eligible.

The Chief of the Weather Bureau, having a complete record of the work performed by each employee therein, is better able to determine the fitness of officials for advancement and assignment than are those not familiar with the details of the service, no matter how much the latter may have the welfare of the public service at heart.

The annoying of United States Senators, Representatives, and other distinguished persons, or representative commercial bodies, with selfish importunities is to be deprecated, and will militate against the persons who may employ, encourage, or countenance such action. Officials of the Weather Bureau are expected to have the confidence and respect of prominent representative men in their localities, and it will at all times be pleasing to receive evidences of efficiency on the part of Weather Bureau officials and of the value of their service to the public; but such testimonials must not be the result of promptings or importunities of the employee interested.

You are an observer with a fair record in one of the minor grades. Were you to succeed in effecting your promotion to the grade of Section Director over the heads of many officials of higher rank and superior qualifications, the same line of procedure might in course of time be exercised to your personal detriment and some other official displace you by the same method. If you have merit, it will be recognized in due course of time as the needs of the service render possible and as the comparative merits of your coworkers render practicable and just.

AN AMERICAN METEOROLOGICAL SOCIETY.

In order to advance the interests of any enterprise it is common to form an association and hold regular meetings for discussing the subject. Many societies, academies, and associations have thus contributed to the development of science, but it would be unfair to say that these have done more for science than has been done by individual efforts, or by the influence of universities and scientific schools. The formation of a voluntary association of individuals implies that there is a common need, and that the association can subserve the common interest. It would not be wise to add to the scientific organizations or to the scientific periodicals at present existing, unless there be a reasonable prospect of accomplishing something desirable that is not done by the existing institutions.

So far as concerns meteorology and climatology there are doubtless many features whose development can be especially furthered by local clubs, each of these to embrace the few persons who are especially interested in such matters, and can easily meet together or correspond with each other. Thus a club of three or four in any city or university could cooperate in investigating local clouds, auroras, thunderstorms, frost, hail, the vertical distribution of temperature, and numerous other local problems. A group of a half dozen or more stations within a few miles of each other could, by maintaining the most delicate self-recording apparatus, determine on the one hand the nature, origin, and movement of the sudden variations of the barometer and their connection with gusts of wind and falling rain, and on the other hand the relations in general between the wind directions and the isobars at that spot on the earth's surface. Pairs of observers, at high and low stations, could investigate the weight of the intermediate column of air and its relation to the observed pressures, temperatures, and moisture; two cloud observers, or photographers, and one kite flyer could, by preconcerted action, determine the altitude and details of the clouds and their relations to sunshine and the temperature and moisture of the layers of air in their neighborhood. The relation of local climate to any special crop is another matter of very special investigation, but the general laws that result therefrom must interest the whole scientific world. These little clubs of interested students represent narrow specialties, matters of which a general association may take cognizance, but to which it should not be confined.

If there is to be a general meteorological society it would be best to have its membership include all America, i. e., the United States and Canada, and as far as possible Mexico, the West Indies, and Central America, since every part of this great region is mutually interested in the weather and the climate of the other parts. Moreover, the storms, the northers, the cold waves, the hot waves, the rains, and the general peculiarities of the successive seasons can be properly studied only when we take cognizance of a very large region of atmosphere. But of course an association that covers so large an area can at the best have only an annual or triennial meeting; the interest of the members in each other's work and in the general progress of meteorology must, necessarily, be kept up by means of an efficient meteorological journal whose expenses must be wholly defrayed by the society. There are few, if any, scientific journals whose subscription lists defray anything more than a small portion of the expense, to say nothing of the salary of the editor. The percentage of self-sustaining journals is even less than the percentage of books that pay the authors an appreciable income, and yet we print books and sell them

and buy them, for we must have them to read and study. It would seem that it is impossible to repay an author, in money, for the intellectual labor expended upon his investigation, essay, memoir, or volume. Equally is it impossible for the reader to make a financial estimate of the intellectual stimulus and mental food that he receives by reading the book. Our modern intellectual and scientific life is above all financial and even utilitarian ideas. Money is very convenient as a medium of exchange in buying and selling ponderable matter, but it has no more definite relation to intellectual attainments than it has to pain or pleasure or the sentiment of justice. Meteorological journals or associations and meteorological progress in general will have to be prosecuted in the future as in the past by sacrifice — say rather, by the devotion—of time and money and personal energies quite independent of the utilitarian aspects of the results that have been or will be attained.

In order that an American meteorological association should prosper with as little expense and friction as possible, it would be best to have but one meeting annually, at the time and place of the August meeting of the American Association for the Advancement of Science. This annual meeting need only occupy a part of one day, leaving the members free to attend all meetings of the general association. Its time need not be taken up with the discussion of scientific details that can be referred to the physical, geographical, and other sections of the Association, but it may be profitably given to the consideration of matters of business bearing on the promotion of the general interests of this special branch of science. The special annual meetings of several societies are now held under the shadow of the general American Association.

NOTES FROM THE REPORTS OF STATE SECTIONS.

ALABAMA.

Mr. A. M. Valerio, voluntary observer at Daphne, describes the smudge invented by the Meacham Bros., of Riverside, Cal., quoting from the Alabama report of April, 1897:

> The system is very simple. A piece of ordinary wire screen 4 feet square is fastened at the corners to four stakes set in the ground. Six inches in thickness of wet leaves or straw is placed on the screen, with a can of crude petroleum underneath. When the oil is ignited a dense white smoke arises, which soon fills the orchard, and so heavy that it does not rise much above the tree tops. There is an entire absence of sooty smoke which, in experiments in years gone by, proved objectionable because it rendered the fruit unfit for use, but in its stead is a white smoke. It is shown that twenty of these screen baskets are ample for a 10-acre orchard.

COLORADO.

From the special reports on snowfall the Section Director, F. H. Brandenburg, makes the following summary:

> The majority of the reports show that the snowfall during February was generally less than a foot, and, being very light, made little if any addition to the stock of snow at great altitudes, at best only making good the loss by evaporation. In the parks and hills of less elevation the high temperatures and bright sunshine caused not only a disappearance of the current fall, but of considerable old snow as well. A comparison of the averages for February, 1897, with current averages shows that the amount of snow on the ground in the parks and hills is about one-fourth as much as a year ago, and that on the highest ranges the depth is less than one-half that reported last year.

MARYLAND.

Mr. E. G. Kinsell, voluntary observer at Green Spring Furnace, Washington County, about 500 feet above sea level, gives an account of one of the heaviest local rainfalls. It occurred apparently on the 9th of August, 1887. It had been an exceedingly hot day and at about 5 p. m. dark storm clouds began to gather. About 6 p. m. it began raining heavily and so continued without intermission until 9:30 p. m. No rain gauge was at hand, but the water collected in buckets and barrels indicated a rainfall of 12 to 14 inches during that interval, both at Green Spring Furnace and at a point 2 miles north of it. This rainfall was confined to very narrow limits, covering an area that extended 4 or 5 miles from east to west and about 5 miles north and south. There was no wind whatever during the rain. Of course a great amount of damage was done within that area which is a few miles north of the Potomac River and the Chesapeake and Ohio Canal.

MONTANA.

The name of the station Hogan has been changed to Dearborn Canyon because its location at the base of the main range of the Rocky Mountains and in the mouth of the Canyon causes its climate to be much more like that of the station known by the same name than like that of the post office at Hogan, which is 13 miles distant.

On January 31 the observer at Greatfalls, Cascade County, recorded a series of hot winds in the south and southwest between 11:30 a. m. and 1:45 p. m., during which the temperatures rose to 58° or 71°, according to locality. The same hot wind was experienced over a narrow region, including Fort Benton in Choteau County and Fort Logan in Meagher County. The comparison of records at adjacent stations shows that the maximum temperature of 64° for January, reported by the Greatfalls observer, was, therefore, not an error, but the record of a fœhn wind. The observer states:

> Strange as it may seem, the "ranges," 20 miles distant, have been covered with ice and snow during the past months, but within that distance the ground around this locality is bare of snow and frozen only to a slight depth.

MINNESOTA AND NEBRASKA.

In both these reports we find extracts from a lecture by Dr. J. G. Macpherson on the formation of dew, as published in Symons' Monthly Meteorological Magazine, for May, 1897. Mr. Macpherson's explanations refer entirely to the dew observed on grass and other plants near the ground, and he correctly shows that this has been condensed so soon after its diffusion upward from the soil, that we may properly say that the water which forms the dew rises from the ground. But all the vapor in the whole atmosphere has risen either from the ground or from the ocean, and in general, whether dew is deposited on the grass or on the house tops or the mountain tops, it must be formed from vapor that originally rose from the earth or ocean. It conveys a wrong impression to say the dew does not fall from the air, for it certainly is condensed from the air upon cold surfaces. It is precipitation in the technical meteorological usage of that word, but does not fall like rain, in fact, it may be said to rise if it is found on the under side of a cold surface. The drops of sap that exude from the tips of many leaves are, of course not dew, but from their resemblance to it are called "false dew." Any attempt to measure the true quantity of dew must avoid including this exudation.

WISCONSIN.

Mr. Wilson gives a special chart and description of the exceptionally severe snowstorm of Saturday, February 19, and Sunday, the 20th. The heaviest snowfall occurred along the eastern and southern borders of the State; the fall at Milwaukee exceeded 24 inches and the drifts were from 10 to 15 feet deep. The timely warnings furnished by the Weather Bureau enabled railroad officials to make ample preparations. The center of the storm passed south of Wisconsin, and heavy northeast winds backing to north prevailed at Milwaukee for fifty-two hours.

THE SEMAQUIR.

The semaquir is said to be a curious stone found in Finland that turns black shortly before the approach of rain, but in fine dry weather it is mottled dark and white. Chem-

ical analysis shows that this stone contains rock salt and niter, which are hygroscopic. When they absorb the vapor from moist air the surface becomes black, but in dry weather the moisture evaporates from the surface and leaves a little of the salt, which has been brought from the interior of the stone, in white spots on the surface. The color of the stone is therefore due to its irregular absorption of the moisture in the air, and it should be called a hygroscope rather than a barometer.

The Editor would be glad to receive any confirmation of the preceding newspaper paragraph.

PECULIAR MOUNTAIN STORMS.

In the MONTHLY WEATHER REVIEW for May, 1897, page 212, will be found a letter from Mr. Joseph H. Struble, of Uniontown, Fayette County, Pa., latitude 39° 45′ N., longitude 79° 45′ W., relative to an interesting local phenomenon. The following additional letter has been received from him on the same subject:

We have in this locality a peculiar kind of what we call an eastern or mountain storm, of frequent occurrence, and which lasts from twenty-four to thirty-six hours. The first indication of the approaching phenomenon is the wind veering from north to east, and when due east it blows with great violence, apparently from over the crests of the Laurel Hill Range of mountains; apparently the storm is principally confined to a distance of about 2 or 3 miles along and from the base of the mountain, but prevails a considerable distance, running north and south at the base. This storm is not noticed east of the mountain or 4 miles from its base. When the storm works south, it ceases and winds up in rain, but never works north. The height of Laurel Hill Mountain Range is from 2,843 to 2,500 feet above the Atlantic Ocean. Uniontown is about 952 feet above sea level, on the National or Cumberland road. The storms alluded to are of more frequent occurrence in the fall and winter season of the year. I have noticed that ice would form on the trees about halfway down the mountain, showing a colder atmosphere on the top of the mountain than at its base during the winter season of the year. If you can tell me where I can obtain a description and explanation of the cause of such strange phenomena, or throw all the light necessary to explain the matter yourself, I will be obliged.

The Editor has already stated, in the REVIEW for May, 1897, that he hesitates to undertake an explanation of any meteorological phenomenon without a reasonable assurance that he is in possession of all the principal facts of the case. It is very much to be desired that Mr. Struble and others make a meteorological study of the region where these interesting stormwinds occur. What we wish to know is the temperature and moisture of the air, the strength and direction of the wind, and the location and motion of the clouds, for some distance east and west of the mountain storm region. It would be especially interesting if some one would fly a small kite on the summit of the Laurel Hill Range and, also, at several points on the western slope. We think it will be found that, even though no strong wind is blowing near the ground between the summit and the belt of stormwinds in the valley at the base of the mountain, yet such a wind will be found a short distance above the ground. Whenever a strong wind blows over a mountain range, it descends a little on the leeward side, and, under certain conditions, may descend like an invisible waterfall to the ground in the valley below. Of course, in such cases, a thin current of warm air clings to the leeward slope of the mountain, while the heavier upper air glides over it down into the valley below. If this descending air is cloudy at the start, then the evaporation of the cloudy particles will keep it cool until it reaches the valley, thereby neutralizing the warmth produced by the compression of the descending air. As the Laurel Hill Mountain Range is from 1,500 to 1,900 feet above Uniontown, the descending air may be warmed up at least 10° F. by compression. The barometer at Uniontown must be 1.5 or even 2 inches higher than at the top of the mountain. A cloud at the top of the mountain whose temperature is 32° F., and which is, therefore, composed of particles of water that are ready to turn into ice whenever they come into contact with any solid substance like the branches of the trees, would, if carried down with the descending winds, deposit ice or sleet during the upper half of its course, but, eventually, having evaporated the remaining particles, would strike the bottom lands as a raw wind whose temperature is slightly above 32°, and, therefore, warmer than the air halfway up the mountain.

A mountain range is not absolutely essential to the formation of these descending currents, they form a very conspicuous feature on the southwest and southeast sides of every general storm center, where cold, cloudy air is systematically pushed rapidly forward over warm, moist layers near the ground; of course, eventually the denser air descends, sometimes rapidly and sometimes on a very gentle decline. The rapid descents give us the gusty weather and the spits of snow or dashes of rain that precede the approach of the cold wave or the belt of clearing, cool, dry weather; the gentle descents give us a beautiful series of undulations in the thick stratum of clouds that may extend from 100 to 500 miles over the land. In general, the violent short-lived gusts on land and sea, whether in the midst of general storms or in clear, dry weather, represent masses of air that are descending by their own density through the surrounding air, and at the same time going forward with considerable velocity. When such descending masses strike the earth, they roll along for a short distance, the barometer suddenly rises a little; the denser air lifts up the warmer air, spreads out in all directions, and keeps its place permanently near the earth as a thin, flat layer until, having received a little heat from the soil or the ocean, it is ready to be pushed up by the next cold gust that descends. This process goes on perpetually in the atmosphere on every scale of magnitude; the little "catspaws" on the water, the flurries of dust on the roadway, the fœhn and the dry chinook winds, the gusty winds with spits of snow in the spring and autumn, the gusts with which the cold waves or northers begin, the straight line gusts that Hinrichs calls "derecho," the gusts that precede thunderstorms, the harmattan and the tornadoes of the west coast of Africa, the pamperos of South America, the trade winds of the tropics, are among the many illustrations of descending winds, some of which continue as horizontal winds for a long time after they reach the earth.

In a mountainous country where the hills are arranged in ridges so regularly as throughout the Appalachian Range, there is, so far as we can see, no reason why there should not be many cases similar to that of Uniontown. The descending air over Uniontown should, as it proceeds westward, rise again and, eventually, form a cloud, even if there be no special hill to the westward. In Espy's "Philosophy of Storms," page 552, a book that will, doubtless, be easily accessible to any voluntary observer in Pennsylvania, the so-called Helm wind of Crossfell, England, is explained essentially as follows: The Crossfell range of hills runs nearly north and south; when a violent east wind blows, the air on the west, or leeward slope, curves downward, as it does in passing across a hollow between two mountains, and is felt over a long narrow region on the west side of the mountain range. Over this windy region there is no cloud, but on the west of this region a distinct cloud is seen, always in the same position and called the "Bar," while on the east side of this region there is a cloud called the "Helm." This Helm cloud is simply the bold, clearly defined end of a series of clouds or a roll of clouds extending eastward behind the Helm. A similar series of clouds extends westward from the Bar. The open space overhead between the Helm and Bar extends 5, 10, or even 30 miles north and south, and is from one-half to five miles wide. It is simply an elliptical opening over the region where the descending cloudy air is so warmed up by its descent that the cloud mostly disappears; only small pieces

are occasionally seen, passing rapidly from the Helm over to the Bar, showing that a strong east wind prevails there. Above this open space, in the open stratum of clouds, one may often see a higher stratum which is evidently so high up that it is above the influence of the valley and the lower winds.

LUNAR RAINBOW.

A brilliant lunar rainbow was observed at Louisville, Ky., on February 27, between 8 and 10 p. m. As described by Weather Bureau Observer O'Connor a small circle appeared first, formed in the thin fibrous clouds that were moving from west to east. As these spread over the heavens a large circle of about 40° in diameter was observed encircling the zenith at 8:20 p. m. As the moon descended in the west this circumzenithal circle increased in diameter until at 9:10 p. m. it was about 60° in diameter, after which it began to fade away in the east, and by 9:50 had entirely disappeared. The circle about the moon itself at no time exceeded 6° in diameter. When first formed it appeared to be a true circle, but as the moon approached the horizon it became oblong and finally, before disappearing, had dwindled into a mere line, passing vertically through the moon at about 10 p. m. In the earlier stages the circle around the zenith had a greenish tint.

WATERSPOUT.

According to an extract from the San Francisco Call, the British bark *Fairfield*, of Glasgow, encountered on her trip between Shanghai and Tacoma a waterspout and hurricane that stripped her bare of canvas. The *Fairfield* passed within a quarter of a mile of this waterspout when about a week out from Shanghai, viz, on February 10. The sky became suddenly overcast and soon an electric storm was raging. The sky darkened and the wind came in puffs of hurricane violence. An attempt was made to turn the ship northward but it was too late to escape the storm. In a very few minutes an immense black funnel cloud went swirling by, striking terror into every one aboard. There was an awful roar and the water seemed to be sucked from the ocean up to a height of 300 feet. Had the *Fairfield* been in the path of the waterspout she might have been destroyed in a twinkling. An hour after the waterspout passed the sun was shining and the ship was sailing through a peaceful sea as though nothing had happened. The vessel was in the most violent part of the storm for about forty minutes.

PHOTOGRAPHS OF METEOROLOGICAL PHENOMENA.

The Weather Bureau has received from Mr. S. B. Strong, voluntary observer at Setauket, N. Y., a small photograph of the parhelia observed at that place on February 2, 1898, at 4:50 p. m. It is very interesting to find that not only the mock sun, but even the vertical and horizontal bands of light and a portion of the circular halos can be traced on this picture, and Mr. Strong's success in this work leads us to encourage other amateur photographers to attempt to preserve similar beautiful optical phenomena that are especially frequent at our western stations. But, in order to make these photographs of any use in the investigation of the halo phenomena, it will be necessary for the observer to devise some way by which to secure on this same plate some means of making accurate observations of the apparent angular distances. For instance, the present photograph shows the mock sun located about an inch and three-quarters to the right of the real sun. If we knew that the camera was pointed midway between the two, and that the focal length of the lens was about three inches, then we might figure out that the apparent angular bearing of the mock sun was about 30° to the right of the true sun. The photograph also shows both these suns elevated about one-third of an inch above the hills in the distant horizon, which we may figure out to be equivalent to an apparent angular altitude of about 10°. But what the meteorologist wants is the angular altitude above the true horizon below these hills, and the angular distance between the true sun and the mock sun; in fact, all the measurements relating to halos and parhelic circles must be given in angles. An ordinary photograph is merely a good witness to the fact that a halo occurred; it must be accompanied by some basis for angular measurements before it can be of any further use to the meteorologist. A common method of accomplishing this object consists in placing in front of the camera a framework of wires stretched at right angles to each other and so placed that one set is strictly horizontal and the other vertical. The intersection of the middle wires on the frame should be directly in front of the camera, and be photographed in the middle of the plate when the axis of the camera is exactly horizontal, as determined by a spirit level or plumb line. If we know the distance of the center of the wire frame from the optical center of the lens, we can easily calculate by trigonometry the angle subtended by the respective wires. If now, in this position, a photograph of the framework is taken on one of the plates that just fits into the plate holder, we find the latter covered by the pictures of the wires intersecting each other in a network. In general, the images of the wires will not appear straight but slightly curved, depending upon the lens that is used. Nevertheless, we know that every point along any one of the horizontal wires is at a known distance above or below the center of the plate and every point on any one of the vertical wires is at a known angular distance to the right or left of the center. Such a plate as this negative can now be preserved for future use. Whenever a landscape is photographed and measurements are desired the negative containing this network of lines is laid upon the landscape negative and a print of the two combined is taken, on which measurements of angular distances can be made with ease.

When this method is to be applied to clouds or other objects where the axis of the camera must be tilted upward, it is convenient to attach the camera, as a whole, to some altitude and azimuth instrument. If this is done with great accuracy it constitutes the apparatus known as "the photogrammeter" which has been much used during the past few years in the international cloud work. This apparatus becomes rather expensive when well made, but is universally applicable to photography of clouds, halo phenomena, waterspouts and tornado clouds, meteors or shooting stars, flying birds, kite work, and to sketches—we regret not to be able to say photographs—of the aurora borealis and the zodiacal light. It is evident, therefore, that our voluntary observers who possess cameras will contribute to exact meteorology in proportion as they obtain the additional equipment needed to attain accurate angular measurements.

GREENWICH NOON.

A voluntary observer, referring to a paragraph in the MONTHLY WEATHER REVIEW for August, 1897, and which has been repeated in the introduction to succeeding REVIEWS, inquires: "When it is 12 o'clock noon at Greenwich, is it then exactly 7 o'clock a. m. at stations 75° west of Greenwich?" To this question we answer, "Yes." Every 15° of longitude corresponds to one hour of time. The earth rotates on its axis—that is to say, any point describes a small circle of latitude around the earth's axis, or 360° in twenty-four hours, or at the rate of 15° per hour. When the Greenwich meridian passes through the sun, that is to say, when it is "mean noon" at Greenwich, then a station like Philadelphia, 75° west of Greenwich, is still five hours distant from the sun, and has

at that time 7 a. m.; a station in longitude 90°, such as New Orleans, is then six hours from the sun, and its clocks therefore indicate 6 a. m.; Denver, on the one hundred and fifth meridian, is seven hours from the sun and has 5 a. m.; Carson City, on the one hundred and twentieth meridian, which is eight hours from the sun, has 4 a. m.

One of the great reforms of the last twenty years has been silently advancing, until now it pervades all civilized nations. This amounts virtually to an international agreement that longitude and time shall be, as far as practicable, referred to the Greenwich meridian. As with railroads, so now with individuals, watches and clocks are no longer set to so-called astronomical local time, but to the time appropriate to the nearest whole hour from Greenwich. Thus, in the Atlantic States, we use seventy-fifth meridian time, but in the Mississippi watershed ninetieth meridian time, except, perhaps, in the western portion, where the one hundred and fifth meridian is adopted.

For many years meteorological observations have been made simultaneously in all parts of the globe, and in the majority of cases at 1 p. m., Greenwich time, but in a few cases at noon.

WHIRLING ALTO-CUMULUS CLOUDS.

The Weather Bureau Observer at San Diego, Cal., forwards the following extract from his daily journal for February 20, 1898:

An hour before sunset, or about 7:45 p. m., a narrow strip of fog was observed on the western horizon; above this, extending probably 35°, was a bank of alto-cumulus cloud. From the upper edge of this cloud whirling alto-cumulus took their flight one by one. These peculiar clouds, mentioned by Mr. McAdie in the MONTHLY WEATHER REVIEW, were beautifully formed and their rotary motion was almost apparent, the whirl from the time of formation to their dissolution in the upper region of alto-cirrus cloud lasted but four or five minutes.

CORRECTIONS.

Mr. R. DeC. Ward, who has lately returned from a visit to the Harvard College observatory meteorological stations in Peru, kindly calls attention to an error in the MONTHLY WEATHER REVIEW for December, in the foot-note on page 540. The altitude of the station at Echarati is 3,300 feet; the altitude, 11,378, as given in this foot-note, belongs to the station at Cuzco.

On page 541, line 4, for "1875" read "1895."

Mr. Morrill calls attention to the legend on Chart IV of the JANUARY REVIEW: The station temperatures are reduced to sea level by using a date that varies with the season of the year; it is 2° on the average for the whole year, but is 1.5° during December, January, and February.

RECENT EARTHQUAKES.

Prof. E. W. Morley, of Cleveland, Ohio, reports that no seismic disturbance was recorded there during February. There was also none recorded at the Weather Bureau on the Marvin seismoscope.

The following earthquakes have been reported:

2d, near Brinnon, Wash., slight shock of earthquake at 6:30 p. m.

20th, Corinne, Utah, earthquake at 5 p. m.

22d, Ellensburg, Wash., earthquake at 5:30 a. m.

FRANK BURKE.

Frank Burke, Local Forecast Official and Director of the Kentucky Section of the Climate and Crop Service, Weather Bureau, died at the home of his father, William H. Burke, at Watertown, Mass., on February 3, 1898, at the age of 36. He was born at Lowell, Mass., and was educated in the public schools of Boston and the Massachusetts Institute of Technology. He entered the Signal Service (now Weather Bureau) on May 11, 1880, and, after pursuing the prescribed course of instruction at Fort Whipple, Va., was assigned to duty as station assistant. For his good work he was successively promoted to the grades of first-class private, corporal, and sergeant in the military-meteorological service, and on July 1, 1891, he (with others) was transferred to the civilian position of observer in the Weather Bureau, by the Act of Congress transferring the meteorological duties of the Signal Service to the Department of Agriculture. In December, 1892, he was advanced to the grade of local forecast official, and on January 1, 1897, he received promotion to the important position which he held at the time of his death. He served at the following-named stations: Des Moines, Iowa; Helena, Fort Missoula, Crow's Nest, and Fort Maginnis, Mont.; Columbus, Ohio, and Louisville, Ky.; at the latter point he founded the Kentucky Section of the Climate and Crop Service.

Mr. Burke took an ardent, active, and intelligent interest in the work to which he gave so many years of his life, and by his death the Weather Bureau sustains the loss of one of its most trustworthy, efficient, and valued officials.

WILLIAM E. BUTLER.

Mr. William E. Butler, Observer, Weather Bureau, died on February 25, 1898. This announcement will be received with sadness by all who knew him.

Mr. Butler entered the meteorological service by enlistment in the Signal Corps in January, 1886, and was assigned to Fort Myer, Va., for instruction, thence to the Central Office in Washington, D. C., for clerical duty for a short period. In October, 1886, he was transferred to the station at Chicago, Ill., as assistant, following which he served in the same capacity at Jacksonville, Fla., Memphis, Tenn., and Atlanta, Ga. In March, 1892, he was placed in charge of the station at Vicksburg, Miss., and in December, of the same year, he was transferred to Hannibal, Mo., and placed in charge of the station there. He remained at Hannibal until August, 1895, when poor health made it necessary for him to seek a change of climate, and he was sent to the Denver, Colo., station as assistant. He remained there until June, 1896, when he was transferred to Omaha, Nebr., as assistant. He remained at Omaha only a few months when failing health again made it necessary for him to secure an assignment to a station of higher altitude. Accordingly he was sent to Salt Lake City, Utah, as an assistant. Here he faithfully performed his duties until September 28, 1897, when his weak physical condition compelled him to quit work. He went to Denver, Colo., to be with friends and receive medical treatment, where he continued to grow weaker, although hopeful to the last.

METEOROLOGICAL TABLES AND CHARTS.

By A. J. HENRY, Chief of Division of Records and Meteorological Data.

Table I gives, for about 130 Weather Bureau stations making two observations daily and for about 20 others making only one observation, the data ordinarily needed for climatological studies, viz, the monthly mean pressure, the monthly means and extremes of temperature, the average conditions as to moisture, cloudiness, movement of the wind, and the departures from normals in the case of pressure, temperature, and precipitation, the total depth of snowfall, and the mean wet-bulb temperatures. The altitudes of the instruments above ground are also given.

Table II gives, for about 2,700 stations occupied by voluntary observers, the highest maximum and the lowest minimum temperatures, the mean temperature deduced from the average of all the daily maxima and minima, or other readings, as indicated by the numeral following the name of the station; the total monthly precipitation, and the total depth in inches of any snow that may have fallen. When the spaces in the snow column are left blank it indicates that no snow has fallen, but when it is possible that there may have been snow of which no record has been made, that fact is indicated by leaders, thus (....).

Table III gives, for about 30 stations furnished by the Canadian Meteorological Service, Prof. R. F. Stupart, director, the means of pressure and temperature, total precipitation and depth of snowfall, and the respective departures from normal values, except in the case of snowfall.

Table IV gives, for 26 stations selected out of 113 that maintain continuous records, the mean hourly temperatures deduced from the Richard thermographs described and figured in the Report of the Chief of the Weather Bureau, 1891–92, p. 29.

Table V gives, for 26 stations selected out of 104 that maintain continuous records, the mean hourly pressures as automatically registered by Richard barographs, except for Washington, D. C., where Foreman's barograph is in use. Both instruments are described in the Report of the Chief of the Weather Bureau, 1891–92, pp. 26 and 30.

Table VI gives, for about 130 stations, the arithmetical means of the hourly movements of the wind ending with the respective hours, as registered automatically by the Robinson anemometer, in conjunction with an electrical recording mechanism, described and illustrated in the Report of the Chief of the Weather Bureau, 1891–92, p. 19.

Table VII gives, for all stations that make observations at 8 a. m. and 8 p. m., the four component directions and the resultant directions based on these two observations only and without considering the velocity of the wind. The total movement for the whole month, as read from the dial of the Robinson anemometer, is given for each station in Table I. By adding the four components for the stations comprised in any geographical division the average resultant direction for that division can be obtained.

Table VIII gives the total number of stations in each State from which meteorological reports of any kind have been received, and the number of such stations reporting thunderstorms (T) and auroras (A) on each day of the current month.

Table IX gives, for about 70 stations, the average hourly sunshine (in percentages) as derived from the automatic records made by two essentially different types of instruments, designated, respectively, the thermometric recorder and the photographic recorder. The kind of instrument used at each station is indicated in the table by the letter T or P in the column following the name of the station.

Table X gives a record of rains whose intensity at some period of the storm's continuance equaled or exceeded the following rates:

Duration, minutes..	5	10	15	20	25	30	35	40	45	50	60	80	100	120
Rates pr. hr. (ins.)..	3.00	1.80	1.40	1.20	1.08	1.00	0.94	0.90	0.86	0.84	0.75	0.60	0.54	0.50

In the northern part of the United States, especially in the colder months of the year, rains of the intensities shown in the above table seldom occur. In all cases where no storm of sufficient intensity to entitle it to a place in the full table has occurred, the greatest rainfall of any single storm has been given, also the greatest hourly fall during that storm.

Table XI gives the record of excessive precipitation at all stations from which reports are received.

NOTES EXPLANATORY OF THE CHARTS.

Chart I.—Tracks of centers of high pressure. The roman letters show number and order of centers of high areas. The figures within the circles show the days of the month; the letters *a* and *p* indicate, respectively, the 8 a. m. and 8 p. m., seventy-fifth meridian time, observations. The queries (?) on the tracks show that the centers could not be satisfactorily located. Within each circle is given the highest barometric reading reported near the center. A blank indicates that no reports were available. A wavy line indicates the axis of a ridge of high pressure.

Chart II.—Tracks of centers of low pressure. The roman letters show number and order of centers of low areas. The figures within the circles show the days of the month; the letters *a* and *p* indicate, respectively, the 8 a. m. and 8 p. m., seventy-fifth meridian time, observations. The queries (?) on the tracks show that the centers could not be satisfactorily located. Within each circle is given the lowest barometric reading reported near the center. A blank indicates that no reports were available. A wavy line indicates the axis of a trough or long oval area of low pressure.

Chart III.—Total precipitation. The scale of shades showing the depth of rainfall is given on the chart itself. For isolated stations the rainfall is given in inches and tenths, when appreciable; otherwise, a "trace" is indicated by a capital T, and no rain at all, by 0.0.

Chart IV.—Sea-level isobars and isotherms, and resultant winds. The wind directions on this Chart are the computed resultants of observations at 8 a. m. and 8 p. m., daily; the resultant duration is shown by figures attached to each arrow. The temperatures are the means of daily maxima and minima and are reduced to sea level. The pressures are the means of 8 a. m. and 8 p. m. observations, daily, and are reduced to sea level and to standard gravity. The reduction for 30 inches of the mercurial barometer, as shown by the marginal figures for each degree of latitude, has already been applied.

Chart V.—Hydrographs for seven principal rivers of the United States.

Chart VI.—Surface temperatures; maximum, minimum, and mean. Lines of equal monthly mean temperature in red; lines of equal maximum temperatures (broken) in black; and lines of equal minimum temperature (dotted) also in black.

Chart VII.—Percentage of sunshine. The average cloudiness at each Weather Bureau station is determined by numerous personal observations during the day. The difference between the observed cloudiness and 100, it is assumed, represents the percentage of sunshine, and the values thus obtained have been used in preparing Chart VII.

Chart VIII.—The total snowfall. This is based on the reports from all available observers and shows the depth of the snowfall during the month in inches. In general, the depth is shown by lines and areas of equal snowfall, but in some cases figures are also given for special localities.

Chart IX.—Depth of snow on ground. This chart is based essentially upon reports from regular and special observers and shows the depth of snow lying on the ground at the end of the month, which is, therefore, the accumulated excess of the snowfall over its loss by melting, evaporation, and settling.

Chart X.—Curves of the meteorological elements at the Royal Alfred Observatory, Mauritius, during the passage of a cyclone on December 4 to 6, 1897.

TABLE I.—*Climatological data for Weather Bureau Stations, February*, 1898.

Stations.	Elevation of instruments.			Pressure, in inches.			Temperature of the air, in degrees Fahrenheit.										Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.			Wind.				Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Total snowfall.
	Barometer above sea level, feet.	Thermometers above ground.	Anemometer above ground.	Mean actual, 8 a. m. and 8 p. m. + 2.	Mean reduced.	Departure from normal.	Mean max. and min. + 2.	Departure from normal.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Greatest daily range.					Total.	Departure from normal.	Days with .01, or more.	Total movement, miles.	Prevailing direction.	Maximum velocity. Miles per hour.	Maximum velocity. Direction.	Maximum velocity. Date.					
New England.							30.7	+ 3.5											81	5.02	+ 1.5								6.0	
Eastport	76	69	74	29.98	30.07	+ .11	28.0	+ 6.0	42	12	33	4	3	23	23		26	23	82	6.37	+ 2.7	16	9,764	nw.	66	ne.	1	6	4	18	7.4	23.5
Portland, Me	103	81	89	29.92	30.03	+ .02	27.6	+ 3.0	50	10	34	− 4	3	21	24		25	23	84	7.61	+ 4.1	10	5,491	nw.	38	nw.	16	5	8	15	6.9	18.0
Northfield	872	15	65	29.10	30.10	+ .04	21.6	+ 5.6	47	12	30	−21	3	13	34		19	16	82	3.72	+ 1.6	14	5,893	s.	54	nw.	16	4	8	16	7.2	43.3
Boston	125	115	181	29.92	30.06	+ .01	32.8	+ 4.8	59	10	40	5	2	26	33		29	25	76	4.81	+ 1.3	10	7,733	w.	50	ne.	1	9	5	14	5.9	11.5
Nantucket	14	43	54	30.05	30.06	− .03	34.0	+ 3.0	50	12	40	12	2	28	30		31	28	82	1.87	− 1.0	12	7,607	nw.	50	se.	21	11	5	12	5.8	1.7
Woods Hole	22	51	57	.....	.....	.....	32.5	+ 2.8	49	12	38	9	2	27	18		....	....	...	4.14	+ 0.5	10	9,206	se.	70	nw.	1	13	6	9	4.7	6.4
Vineyard Haven	.....	20	....	.....	.....	.....	35.6	+ 3.3	56	12	42	10	2	28	33		....	....	...	4.51	+ 1.4	11	.....	w.	....	.....	...	10	6	12	....	1.1
Block Island	27	39	48	30.05	30.08	+ .01	33.3	+ 2.5	51	12	38	5	2	28	30	31	27	79		5.20	+ 0.8	12	10,007	nw.	66	e.	20	12	10	6	4.5	5.4
Narragansett Pier	.....	10	....	.....	.....	.....	30.8	+ 1.7	51	10	39	0	2	23	34		....	....	...	7.42	+ 2.9	9	.....	s.	....	.....	...	15	4	9	....	12.0
New Haven	107	118	140	29.96	30.08	− .01	31.2	+ 2.4	57	10	38	2	2	24	30	38	24	79		4.55	+ 0.4	13	6,452	n.	40	w.	16	10	5	13	5.6	6.6
Mid. Atlan. States.							34.5	0.0											73	2.06	− 1.3								4.8	
Albany	97	84	113	29.99	30.11	+ .03	28.0	+ 3.8	52	10	35	− 6	2	21	28	24	20	78		3.57	+ 0.9	11	5,566	s.	34	se.	5	7	6	15	7.0	23.5
Binghamton	875	79	90	.....	.....	.....	27.5	+ 3.6	54	12	34	− 3	2	21	35		....	....	...	2.51	.....	15	4,609	nw.	30	w.	16	5	10	13	6.6	17.7
New York	314	208	326	29.74	30.09	− .03	33.0	+ 1.5	60	10	39	5	2	27	27	29	25	75		4.06	+ 0.3	14	8,556	w.	48	w.	16	10	6	12	5.4	2.5
Harrisburg	377	94	104	29.71	30.14	− .02	31.8	− 0.7	57	11	38	6	4	26	25	27	21	68		1.60	− 1.2	8	5,893	w.	48	nw.	16	11	9	8	5.4	1.3
Philadelphia	117	168	184	29.98	30.11	− .02	35.6	+ 2.1	61	11	43	8	2	28	24	31	26	73		2.80	− 0.4	10	6,915	nw.	41	nw.	16	12	8	8	4.8	0.7
Atlantic City	52	68	76	30.06	30.12	+ .02	34.6	+ 0.7	59	10	41	7	2	28	27	32	28	81		1.86	− 1.5	8	7,347	nw.	49	nw.	16	15	8	5	4.0	0.9
Cape May	24	52	70	30.11	30.13	.....	35.3	− 0.4	50	12	40	14	2	30	16	32	....	....	...	1.55	.....	8	8,221	nw.	....	.....	...	15	6	7	....	T.
Baltimore	123	68	82	29.99	30.13	− .01	35.2	− 1.0	65	12	43	10	2	28	27	30	23	65		1.32	− 2.2	6	3,668	w.	28	sw.	16	15	5	8	4.4	T.
Washington	112	59	76	30.02	30.15	+ .01	35.0	− 0.8	67	12	44	2	4	26	34	29	23	69		1.64	− 1.7	5	5,032	nw.	46	nw.	16	12	8	8	4.7	T.
Cape Henry	.....	5	34	.....	.....	.....	40.1	− 3.8	70	12	47	18	•	33	28	....	....	....	...	1.51	− 2.0	6	.....	n.	....	.....	...	5	16	7	....	
Lynchburg	685	83	88	29.40	30.17	+ .03	37.5	− 2.5	72	10	48	8	4	27	41	31	25	69		0.74	− 2.8	5	3,164	nw.	46	nw.	15	18	7	3	3.2	0.1
Norfolk	57	88	93	30.09	30.16	+ .02	40.8	− 2.0	69	12	49	15	2	32	31	36	33	82		1.48	− 2.4	7	5,385	nw.	59	nw.	15	19	3	6	3.0	
Richmond	144	98	105	.....	.....	.....	38.4	.....	71	12	48	11	2	29	34	....	....	....	...	1.05	.....	6	3,697	n.	31	w.	15	15	7	6	4.1	T.
S. Atlantic States.							46.3	− 3.5											69	1.30	− 2.5								3.8	
Charlotte	773	68	76	29.31	30.16	+ .01	41.5	− 3.5	69	12	51	12	2	32	30	34	25	57		0.81	− 3.7	3	4,282	ne.	40	w.	15	14	7	7	3.8	T.
Hatteras	11	17	36	30.13	30.14	+ .01	44.6	− 2.0	66	12	50	22	2	39	22	41	39	83		1.75	− 2.7	7	10,018	n.	52	w.	16	17	4	7	4.2	
Kittyhawk	9	12	30	.....	.....	.....	42.9	− 3.1	70	12	50	18	2	36	33	....	....	....	...	2.45	− 1.3	6	.....	.....	....	.....	...	18	4	6	....	
Raleigh	375	93	101	29.77	30.18	.00	40.8	− 3.1	70	11	50	14	2	31	32	35	27	64		0.42	− 3.6	5	3,547	n.	33	nw.	15	13	5	10	4.5	
Wilmington	78	82	90	30.08	30.17	+ .03	45.6	− 4.2	70	12	55	18	2	37	31	40	35	75		3.27	0.0	6	5,228	w.	51	w.	16	16	9	3	3.4	
Charleston	48	14	92	30.14	30.19	+ .04	50.1	− 2.7	76	12	57	26	2	43	22	42	35	63		0.51	− 2.8	4	6,771	n.	40	nw.	16	15	9	4	3.4	
Columbia	.....	5	....	.....	.....	.....	45.0	− 4.2	76	12	57	14	2	33	36					0.60	− 3.6	5	.....	ne.	....	.....	...	14	7	7	....	
Augusta	180	80	103	29.97	30.17	+ .03	46.1	− 4.3	74	12	58	19	2	34	36	38	32	66		0.53	− 3.4	2	4,350	w.	39	w.	15	15	8	5	3.6	
Savannah	82	63	89	30.08	30.18	+ .01	51.2	− 3.1	76	18	61	33	2	41	36	43	37	68		0.56	− 2.5	4	5,738	nw.	36	nw.	15	15	6	7	3.7	
Jacksonville	43	69	84	30.13	30.18	+ .03	55.6	− 2.8	76	12	65	27	2	46	28	49	45	79		2.10	− 1.0	6	4,805	ne.	30	sw.	27	17	9	2	3.5	
Florida Peninsula.							64.0	− 3.1											74	0.90	− 1.4								3.5	
Jupiter	28	13	30	30.11	30.14	.00	64.0	− 3.1	80	20	71	40	2	57	24	57	53	74		0.93	− 1.6	5	6,915	nw.	29	s.	18	13	13	2	3.6	
Key West	22	43	50	30.12	30.14	+ .02	68.6	− 2.8	81	20	72	54	2	65	12	62	59	75		0.22	− 1.4	3	8,318	ne.	34	n.	1	14	11	3	4.0	
Tampa	36	60	67	30.13	30.17	+ .03	59.3	− 3.5	80	19	70	31	2	49	33	52	47	74		1.52	− 1.3	3	4,509	nw.	28	nw.	19	16	10	2	2.8	
East Gulf States.							52.0	− 2.6											74	4.15	− 0.3								3.5	
Atlanta	1,131	92	126	28.97	30.20	+ .02	43.2	− 4.8	67	11	52	13	3	35	30	37	30	67		0.62	− 4.3	5	6,883	nw.	36	nw.	15	14	5	9	4.3	T.
Pensacola	56	78	90	30.13	30.19	+ .03	53.2	− 3.6	69	15	60	29	2	46	23	48	44	75		5.97	+ 2.1	7	6,042	ne.	36	sw.	17	16	9	3	3.1	
Mobile	57	88	96	30.13	30.20	+ .05	52.6	− 2.2	74	15	62	29	2	44	29	47	44	79		5.58	+ 0.9	9	4,788	n.	36	se.	17	13	10	5	2.9	
Montgomery	221	100	112	29.94	30.18	+ .02	49.2	− 3.5	74	10	59	22	2	39	32	42	36	67		2.33	− 3.0	7	4,524	n.	32	se.	11	17	4	7	3.3	T.
Vicksburg	254	65	73	29.87	30.15	.00	52.8	+ 0.2	73	26	62	25	3	44	29	48	45	80		2.81	− 1.8	7	5,008	se.	42	se.	17	17	5	6	3.5	
New Orleans	54	112	120	30.12	30.18	+ .06	56.6	− 1.5	74	26	64	36	2	49	23	50	46	76		6.20	+ 1.7	7	6,036	se.	34	sw.	19	18	5	5	2.8	
Port Eads	.....	27	....	.....	.....	.....	56.7	− 2.9	72	9	64	40	•	49	21	....	....	....	...	5.56	+ 2.3	6	.....	e.	....	.....	...	14	7	7	....	
West Gulf States.							54.2	+ 2.6											74	2.19	− 1.2								4.1	
Shreveport	249	77	84	29.88	30.15	+ .02	53.0	+ 1.8	74	26	62	25	3	43	29	46	40	66		2.41	− 1.8	6	4,882	se.	30	se.	10	13	8	7	4.1	
Fort Smith	481	63	72	29.61	30.14	+ .02	46.3	+ 4.8	71	16	57	17	3	36	34	40	36	73		0.81	− 2.8	5	5,096	e.	28	e.	10	17	4	7	4.0	
Little Rock	302	71	79	29.84	30.18	+ .04	46.0	+ 0.6	71	9	56	18	3	36	37	40	34	68		1.23	− 4.1	7	5,146	w.	30	w.	20	16	4	8	4.3	
Corpus Christi	20	42	50	30.11	30.13	+ .02	61.5	+ 2.5	77	27	67	41	3	56	19	58	56	84		1.00	− 1.4	7	7,566	se.	36	n.	5	11	13	4	3.9	
Galveston	42	85	96	30.09	30.13	+ .02	58.8	+ 1.8	75	27	64	39	3	54	16	55	53	85		4.03	+ 1.0	8	7,200	se.	32	n.	10	15	9	4	3.8	
Palestine	510	54	61	29.59	30.15	+ .02	54.6	+ 3.6	77	26	65	23	3	44	34	50	47	80		4.68	+ 1.2	6	4,793	s.	26	s.	9	13	9	6	4.5	
San Antonio	704	95	104	29.37	30.13	+ .01	58.9	+ 3.1	84	26	69	33	3	48	34	50	43	63		1.16	− 0.8	7	5,975	se.	32	se.	9	13	7	8	4.3	
Ohio Val. & Tenn.							36.9	− 1.1											78	1.53	− 2.7								6.1	
Chattanooga	762	106	112	29.38	30.22	+ .07	41.2	− 4.3	65	14	50	12	3	32	34	35	28	66		0.68	− 4.9	9	5,054	nw.	44	nw.	15	13	6	9	4.8	1.6
Knoxville	1,004	10	88	29.10	30.20	+ .04	39.2	− 3.1	65	10	48	10	3	30	30	35	32	80		0.56	− 4.8	6	5,394	sw.	52	w.	15	17	2	9	4.4	2.0
Memphis	399	140	154	29.74	30.18	+ .03	45.6	+ 0.8	67	9	53	19	3	38	24	39	33	63		1.82	− 3.5	9	7,590	nw.	39	nw.	20	10	10	8	5.3	T.
Nashville	545	138	134	29.58	30.18	+ .04	40.9	− 1.8	70	10	50	9	3	32	29	34	27	63		0.63	− 4.7	5	5,388	nw.	31	nw.	15	13	4	11	4.9	0.6
Lexington	989	75	104	29.05	30.16	+ .04	36.1	+ 0.1	66	10	44	− 1	3	28	32	30	24	67		2.20	− 1.3	10	8,504	sw.	60	sw.	15	4	8	16	7.2	3.4
Louisville	525	114	136	29.56	30.16	+ .02	38.2	0.0	71	10	46	4	3	30	31	33	27	67		1.73	− 2.6	9	6,534	w.	46	w.	15	9	6	13	6.6	1.9
Evansville	434	72	82	.....	.....	.....	38.8	.....	70	10	46	6	3	32	34	....	....	....	...	1.52	.....	8	6,022	w.	38	sw.	4	10	7	11	5.4	1.1
Indianapolis	823	154	164	29.22	30.14	+ .02	32.2	− 0.1	68	10	39	− 4	3	25	30	29	26	79		1.47	− 2.1	13	8,145	s.	41	nw.	15	6	8	14	6.6	3.3
Cincinnati	628	152	157	29.46	30.16	+ .02	34.9	− 1.5	67	10	42	1	3	28	32	31	26	72		2.21	− 1.5	11	6,139	se.	38	nw.	15	7	8	13	6.2	2.8
Columbus	834	87	100	29.22	30.14	+ .02	31.5	− 0.6	66	11	38	− 5	3	24	29	28	24	80		1.67	− 2.1	12	5,747	w.	38	nw.	15	5	10	13	6.7	1.8
Pittsburg	842	116	123	29.21	30.15	+ .02	32.3	− 1.1	70	11	39	0	3	26	29	30	27	82		1.60	− 1.2	10	4,834	w.	26	sw.	24	4	9	15	7.5	3.1
Parkersburg	638	77	84	29.46	30.18	+ .03	33.6	− 0.9	72	11	42	− 2	2	25	35	29	26	82		2.24	− 0.8	15	4,072	nw.	37	nw.	15	1	12	15	7.4	7.2
Lower Lake Region.							37.9	+ 1.4											80	2.56	− 0.1								8.0	
Buffalo	768	178	206	29.22	30.09	+ .01	27.3	+ 2.8	63	11	34	− 3	2	21	31	25	21	77		2.97	+ 0.1	20	10,350	sw.	48	sw.	24	0	10	18	7.9	20.7
Oswego	335	76	87	29.68	30.07	− .02	26.6	+ 2.0	53	11	32	− 7	2	21	22	25	21	81		2.61	+ 0.1	17	8,032	se.	42	n.	15	1	5	22	8.3	19.7
Rochester	533	81	90	29.48	30.07	− .02	27.4	+ 3.0	63	11	33	− 2	2	21	25	25	21	78		3.08	+ 0.4	16	5,548	sw.	28	sw.	12	1	10	17	8.2	26.8
Erie	714	92	102	29.30	30.10	+ .02	28.8	+ 1.3	64	11	34	− 1	3	24	30	26	23	85		2.02	− 1.4	15	7,976	s.	39	n.	15	1	6	21	8.1	7.7
Cleveland	762	190	201	29.24	30.11	+ .01	28.3	+ 0.3	64	11	34	− 4	3	22	29	25	21	77		2.62	− 0.2	19	10,942	se.	65	nw.	15	5	5	18	7.8	12.5
Sandusky	629	62	74	29.39	30.11	+ .01	29.8	+ 0.9	65	11	36	− 3	3	23	28	27	23	79		2.29	− 0.6	12	6,468	sw.	38	nw.	15	0	4	24	8.9	8.8
Toledo	674	122	127	29.34	30.10	+ .01	28.6	+ 0.4	61	11	35	− 5	3	22	26	26	22	78		1.65	− 0.4	13	7,260	sw.	36	sw.	11	6	3	19	7.5	6.5
Detroit	730	160	166	29.27	30.10	+ .02	26.4	+ 0.2	56	11	32	− 4	1	21	27	25	22	85		3.27	+ 0.9	14	7,365	sw.	34	n.	15	5	5	18	7.4	19.6
Upper Lake Region.							22.6	+ 3.0											84	2.37	+ 0.5								7.2	
Alpena	609	61	65	29.37	30.07	.00	21.7	+ 3.7	45	11	28	− 8	3	15	28	20	17	82		2.41	+ 0.4	15	7,223	nw.	37	nw.	2	2	11	15	7.8	21.0
Grand Haven	628	55	64	29.35	30.06	− .01	26.2	+ 1.2	57	11	33	− 1	1	20	28	24	23	88		3.12	+ 0.9	16	7,849	se.	36	sw.	3	0	7	21	8.8	22.5
Marquette	734	67	95	29.22	30.06	.00	20.7	+ 3.6	42	11	26	− 8	3	15	28	19	17	87		3.08	+ 1.3	18	7,593	nw.	38	sw.	6	3	2	23	8.3	32.6
Port Huron	639	70	108	29.36	30.10	+ .02	25.6	+ 2.6	55	11	32	− 6	2	20	22	23	20	81		2.99	+ 0.6	15	8,835	s.	44	nw.	15	7	9	12	6.8	19.7
Sault Ste. Marie	634	58	65	29.35	30.07	+ .01	17.8	+ 5.3	44	8	26	−30	1	10	33	17	14	87		1.77	+ 0.5	14	6,505	e.	40	e.	20	1	9	18	8.0	12.2
Chicago	834	241	274	29.18	30.10	+ .01	27.6	+ 0.8	60	10	34	− 8	3	22	28	26	23	85		2.59	+ 0.3	15	13,039	s.	48	ne.	15	11	6	11	5.7	13.7
Milwaukee	671	106	149	29.33	30.10	+ .01	25.0	+ 2.3	49	10	31	− 7	3	19	26	23	20	80		3.36	+ 1.5	16	7,797	sw.	33	e.	16	4	6	18	7.5	35.4
Greenbay	617	49	57	29.38	30.09	− .01	21.2	+ 5.0	44	11	28	− 8	3	14	25	19	17	84		1.09	− 1.2	15	6,416	sw.	36	n.	20	5	13	10	6.3	9.2
Duluth	702	93	106	29.28	30.10	+ .01	17.2	+ 2.7	38	12	25	−18	2	10	28	17	14	84		0.89	− 0.2	10	7,136	ne.	35	nw.	4	8	13	7	5.4	8.7
North Dakota.							14.7	+ 7.5											76	0.59	0.0								4.7	
Moorhead	935	54	60	29.06	30.16	+ .01	14.2	+ 9.7	51	8	26	−30	18	2	40	11	10	88		0.54	− 0.3	10	7,739	nw.	35	se.	16	9	11	8	5.1	5.4
Bismarck	1,674	16	29	28.26	30.17	+ .01	15.9	+ 6.4	57	8	29	−18	20	2	42	12	3	58		0.48	− 0.1	6	7,213	nw.	40	nw.	12	17	6	5	4.2	4.8
Williston	1,875	15	31	28.02	30.15	− .02	14.0	+ 6.3	55	7	27	−24	20	1	39	11	8	81		0.74	+ 0.4	5	5,871	nw.	38	nw.	12	11	12	5	4.8	7.4
Upper Miss. Valley.							28.7	+ 2.6											77	1.58	− 0.4								5.7	
Minneapolis	.....	99	...	.....	.....	.....	20.5	+ 4.3	46	8	29	−14	2	12	25	....	....	....	...	1.47	+ 0.4	11	.....	nw.	....	.....	...	6	10	12	....	9.6
St. Paul	837	114	124	29.14	30.10	− .02	20.8	+ 5.0	46	8	29	−13	2	13	22	19	15	80		1.69	+ 0.8	12	5,643	nw.	29	nw.	1	7	11	10	6.0	9.4
La Crosse	720	70	78	.....	.....	.....	21.6	+ 1.5	46	10	29	− 9	1	14	26	....	....	....	...	1.16	0.0	12	5,143	n.	30	nw.	2	8	9	11	6.3	17.2
Davenport	599	71	79	29.41	30.09	− .02	26.6	+ 1.3	57	10	33	− 6	1	20	29	24	21	80		1.86	+ 0.3	13	5,805	nw.	27	nw.	23	6	5	17	7.3	12.0
Des Moines	867	84	88	29.16	30.16	+ .06	26.2	+ 3.1	48	14	35	− 7	2	18	34	23	18	74		0.82	− 0.5	7	6,233	n.	31	sw.	10	15	6	7	4.1	3.1

TABLE I.—*Climatological data for Weather Bureau Stations, February*, 1898—Continued.

Stations.	Elevation of instruments: Barometer above sea level, feet.	Elevation of instruments: Thermometers above ground.	Elevation of instruments: Anemometers above ground.	Pressure, in inches: Mean actual, 8 a. m. and 8 p. m. + 2.	Pressure, in inches: Mean reduced.	Pressure, in inches: Departure from normal.	Temperature of the air, in degrees Fahrenheit: Mean max. and min. + 2.	Temperature: Departure from normal.	Temperature: Maximum.	Temperature: Date.	Temperature: Mean maximum.	Temperature: Minimum.	Temperature: Date.	Temperature: Mean minimum.	Temperature: Greatest daily range.	Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches: Total.	Precipitation: Departure from normal.	Precipitation: Days with .01, or more.	Wind: Total movement, miles.	Wind: Prevailing direction.	Wind: Maximum velocity: Miles per hour.	Wind: Maximum velocity: Direction.	Wind: Maximum velocity: Date.	Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness, tenths.	Total snowfall.
Up. Miss. Val.—Con																															
Dubuque	698	101	109	29.30	30.10	.00	24.1	+ 1.5	50	10	32	— 4	1	17	26	22	19	85	2.01	+ 0.6	11	5,703	nw.	35	nw.	2	9	10	9	5.4	18.5
Keokuk	614	64	78	29.43	30.13	+ .02	30.8	+ 2.5	61	10	39	— 4	1	23	35	27	23	77	1.16	— 0.6	8	6,220	nw.	35	w.	4	12	4	12	5.2	3.5
Cairo	359	87	93	29.76	30.16	+ .04	40.4	+ 1.0	68	10	48	11	3	33	26	36	32	76	1.18	— 2.8	10	6,666	nw.	36	nw.	15	10	9	9	5.2	0.4
Springfield, Ill.	644	82	92	29.40	30.12	— .01	32.4	+ 2.1	66	10	39	0	3	26	32	28	24	74	2.70	— 0.7	10	8,004	nw.	34	s.	4	4	12	12	6.6	1.7
Hannibal	534	75	107	.....	.....	.....	34.0	+ 3.5	63	8	43	2	2	26	37	....	....	....	1.60	— 0.8	11	7,504	nw.	36	s.	4	11	5	12	5.3	0.6
St. Louis	567	111	210	29.52	30.15	+ .02	38.4	+ 3.3	71	10	47	6	3	30	32	32	27	69	1.71	— 1.1	10	7,906	w.	42	sw.	14	8	8	12	5.9	0.8
Missouri Valley.							30.6	+ 0.4										74	0.96	— 0.4										4.7	
Columbia	.....	4	84	.....	.....	.....	35.7	+ 2.9	67	8	46	2	3	25	42	....	....	...	1.84	— 0.7	6	7,409	nw.	35	nw.	15	9	7	12	5.9	0.3
Kansas City	963	78	95	29.10	30.17	+ .03	35.4	+ 4.4	65	16	45	4	2	26	33	31	26	70	1.14	— 0.7	4	6,253	nw.	35	nw.	20	11	11	6	4.6	1.6
Springfield, Mo.	1,324	100	103	28.69	30.14	+ .02	38.2	+ 3.5	64	16	47	8	3	29	36	33	28	73	1.68	— 1.8	10	8,533	se.	37	w.	13	8	13	7	5.0	0.9
Topeka	.....	81	....	.....	.....	.....	36.0	+ 4.7	65	16	47	6	2	25	35	....	....	....	1.78	+ 0.2	4	.....	nw.	....	.....	...	12	11	5	....	T.
Lincoln	1,199	74	84	28.80	30.14	.....	31.8	+ 8.4	58	16	41	— 1	2	22	32	26	20	67	0.99	0.0	4	8,066	nw.	44	nw.	23	12	10	6	4.9	1.7
Omaha	1,103	92	97	28.91	30.14	— .01	29.9	+ 4.9	52	14	38	— 2	2	21	32	26	22	76	0.67	— 0.1	8	5,483	nw.	27	nw.	2	13	8	7	4.7	2.5
Sioux City	1,139	96	164	.....	.....	.....	33.8	+ 4.8	47	14	34	— 7	3	14	34	....	....	....	0.37	— 0.2	3	9,530	nw.	45	nw.	13	10	11	7	4.8	5.2
Pierre	1,460	50	62	28.47	30.11	— .06	28.2	+12.8	64	6	42	— 5	2	15	45	23	18	75	0.13	— 0.2	4	6,298	se.	35	n.	1	8	13	7	4.6	0.7
Huron	1,306	56	67	28.67	30.16	— .01	22.4	+10.4	54	6	34	— 9	2	10	39	18	14	81	0.22	— 0.4	5	8,729	nw.	39	nw.	13	11	15	2	4.1	2.2
Yankton	1,234	52	58	.....	.....	.....	26.4	+ 7.2	50	28	36	— 5	2	16	34	...	....	....	0.74	0.0	4	6,519	nw.	36	nw.	17	17	5	6	4.0	8.3
Northern Slope.							30.1	+ 2.2										65	0.21	— 0.3										4.9	
Havre	2,494	46	47	27.30	30.06	— .10	22.8	+ 9.6	58	7	34	—12	1	11	45	19	15	80	0.14	— 0.4	7	7,174	sw.	36	sw.	5	9	10	9	5.5	0.8
Miles City	2,372	41	49	27.48	30.09	— .07	27.2	+11.0	54	12	38	— 9	2	16	39	23	20	83	0.35	— 0.2	5	4,608	s.	40	nw.	12	10	11	7	5.1	1.7
Helena	4,108	88	93	25.80	30.11	— .04	34.2	+12.5	55	15	43	— 1	1	26	29	28	19	56	0.52	— 0.2	6	6,171	sw.	50	sw.	13	7	15	6	5.1	1.2
Rapid City	3,251	46	50	26.60	30.08	— .09	32.2	+11.6	60	6	46	— 6	2	18	45	26	18	63	0.24	— 0.4	6	6,117	w.	36	nw.	19	11	9	8	5.0	1.1
Cheyenne	6,105	58	60	23.98	30.18	+ .01	32.8	+ 5.5	58	21	45	3	2	20	42	25	9	42	0.06	— 0.3	3	8,534	nw.	49	nw.	14	10	13	5	4.8	0.6
Lander	5,372	28	36	24.64	30.20	+ .04	27.9	+ 6.1	52	14	41	— 4	3	15	40	22	15	64	T.	— 0.6	0	2,831	sw.	36	sw.	21	10	15	3	4.7	T.
North Platte	2,826	43	52	27.12	30.18	+ .02	33.6	+ 8.3	62	16	45	3	2	22	36	28	21	66	0.19	— 0.2	1	6,171	nw.	38	nw.	4	14	9	5	4.1	2.0
Middle Slope.							38.6	+ 6.2										63	1.20	+ 0.4										3.7	
Denver	5,290	79	151	24.73	30.17	+ .01	37.8	+ 5.6	65	25	51	10	10	25	37	29	17	49	0.68	+ 0.2	4	5,119	s.	53	w.	4	11	13	4	4.6	6.8
Pueblo	4,713	74	81	25.28	30.13	— .02	38.1	+ 8.0	69	16	54	12	19	22	47	30	17	46	0.06	— 0.4	2	4,944	nw.	43	nw.	4	13	11	4	4.4	0.4
Concordia	1,398	42	47	28.60	30.16	— .01	34.4	+ 6.2	63	16	44	6	2	24	34	30	26	77	0.32	— 0.6	4	4,657	s.	26	nw.	23	11	13	4	4.7	2.1
Dodge City	2,504	44	52	27.45	30.15	+ .03	38.2	+ 6.4	70	16	51	11	2	25	37	30	25	69	0.70	+ 0.1	1	6,464	n.	34	s.	15	18	7	3	3.5	7.2
Wichita	1,351	78	85	28.67	30.15	+ .04	39.0	+ 7.2	72	16	50	12	2	28	37	32	25	64	3.04	+ 1.8	2	6,301	s.	30	n.	9	22	2	4	2.7	T.
Oklahoma	1,218	54	62	28.82	30.15	+ .04	44.1	+ 4.0	76	25	56	18	3	32	38	38	33	71	2.37	+ 1.2	3	7,737	n.	44	nw.	9	21	3	4	2.5	
Southern Slope.							46.5	+ 6.0										58	0.95	— 0.4										2.7	
Abilene	1,749	45	54	28.30	30.17	+ .04	51.1	+ 5.2	80	25	63	21	3	39	35	43	35	64	1.08	0.3	2	6,578	sw.	36	sw.	4	18	8	2	2.5	
Amarillo	3,691	54	61	26.28	30.14	+ .02	41.9	+ 6.7	75	25	55	19	3	28	40	33	21	52	0.82	— 0.4	2	11,133	n.	48	n.	2	20	5	3	2.9	3.5
Southern Plateau.							52.3	+ 3.7										41	0.66	— 0.6										2.3	
El Paso	3,767	10	110	26.23	30.09	+ .01	51.8	+ 2.4	79	26	67	24	3	36	46	38	19	34	0.04	— 0.4	1	6,800	nw.	44	w.	18	16	11	1	2.6	
Santa Fe	6,998	47	50	23.27	30.14	+ .05	36.6	+ 4.6	58	25	47	16	3	26	28	29	19	53	0.30	— 0.5	2	3,600	ne.	26	n.	19	20	8	0	2.8	3.1
Phœnix	1,076	47	57	28.85	29.99	.....	58.8	+ 4.5	81	27	74	36	10	44	38	46	32	41	T.	— 0.9	0	2,224	w.	17	n.	3	20	7	1	2.1	
Yuma	139	16	50	29.86	30.01	— .04	62.0	+ 3.2	84	27	76	40	20	48	40	49	33	37	0.00	— 0.5	0	4,502	n.	30	n.	9	22	5	1	1.7	
Middle Plateau.							37.9	+ 4.0										65	0.54	— 0.7										5.9	
Carson City	4,730	82	92	25.28	30.12	.....	40.6	+ 4.3	65	13	53	20	9	28	37	34	23	55	0.80	— 0.7	6	4,413	sw.	46	s.	24	7	19	2	4.8	4.2
Winnemucca	4,340	59	70	25.72	30.18	+ .03	37.4	+ 4.9	62	24	48	14	1	27	32	34	30	73	0.43	— 0.5	7	.....	.....	....	.....	...	3	17	8	5.8	T.
Salt Lake City	4,344	83	90	25.75	30.28	+ .08	35.6	+ 2.7	60	27	44	16	3	27	36	31	24	66	0.38	— 0.9	3	3,460	se.	26	nw.	21	5	7	16	7.0	1.1
Northern Plateau.							35.8	+ 3.6										75	1.04	— 0.7										6.9	
Baker City	3,470	49	55	26.47	30.15	+ .02	35.2	+10.2	59	14	42	9	2	28	27	30	25	69	0.58	— 1.2	11	4,260	se.	28	se.	6	3	4	21	8.3	3.7
Idaho Falls	4,742	10	56	25.30	30.28	+ .08	24.3	+ 4.3	45	24	34	0	9	15	30	24	22	86	0.34	— 1.6	8	6,800	s.	46	s.	16	9	9	10	5.8	2.9
Spokane	1,943	99	107	27.94	30.04	— .07	38.2	+ 9.7	58	13	44	20	19	32	34	35	30	73	1.93	— 0.1	15	5,594	s.	32	sw.	15	5	6	17	7.4	3.7
Walla Walla	1,018	65	73	28.94	30.04	— .07	45.4	+10.0	65	13	52	26	2	38	22	41	36	73	1.33	0.0	13	5,629	s.	32	s.	20	2	22	4	6.1	0.2
N. Pac. Coast Reg.							44.6	+ 4.2										80	9.25	+ 3.2										8.0	
Fort Canby	179	10	34	29.73	29.93	— .09	44.8	+ 3.1	58	27	48	35	16	41	14	43	41	87	12.49	+ 6.2	26	15,100	s.	75	s.	24	0	3	25	9.1	T.
Port Angeles	29	47	62	.....	.....	.....	42.1	+ 4.3	57	11	48	30	19	36	18	....	....	....	3.62	+ 0.6	14	3,658	w.	38	w.	7	0	17	11	6.9	T.
Pysht	.....	5	....	.....	.....	.....	42.3	+ 3.8	54	27	48	30	19	37	17	....	....	....	11.97	+ 3.8	24	.....	w.	....	.....	...	0	5	23	....	2.0
Seattle	119	100	108	29.82	29.95	.....	45.6	+ 5.7	67	27	51	33	19	40	22	42	39	79	5.98	+ 1.4	23	5,322	se.	27	s.	18	3	11	14	7.2	0.5
Tacoma	213	113	120	.....	.....	.....	44.8	+ 5.9	64	27	51	31	19	39	23	....	....	....	8.68	+ 3.3	23	5,140	sw.	27	sw.	15	1	11	16	8.0	T.
Tatoosh Island	86	7	21	29.79	29.89	— .13	43.4	+ 2.6	54	28	47	32	18	40	13	41	37	78	17.51	+ 9.0	26	12,777	e.	54	nw.	18	0	2	26	9.7	2.0
Astoria	.....	18	....	.....	.....	.....	45.8	+ 2.8	59	27	51	35	21	41	20	...	....	....	14.61	+ 6.9	26	.....	se.	....	.....	...	0	5	23	....	1.0
Portland, Oreg	153	203	213	29.84	30.00	— .08	45.7	+ 4.5	61	14	51	32	8	41	16	43	39	78	6.51	+ 0.4	20	7,270	s.	46	s.	17	0	9	19	7.8	T.
Roseburg	521	56	67	29.45	30.02	— .09	46.8	+ 4.7	68	14	55	29	17	39	27	43	39	76	1.91	— 3.0	13	2,336	s.	28	w.	20	2	13	13	7.1	0.5
Mid. Pac. C'st Reg.							51.0	+ 1.8										76	4.65	+ 0.6										6.2	
Eureka	64	60	69	30.03	30.09	— .01	49.9	+ 3.7	70	2	57	33	22	43	28	46	43	80	8.00	+ 1.9	21	4,526	se.	34	n.	16	0	11	17	7.9	
Redbluff	334	54	58	29.74	30.10	.00	51.0	+ 2.0	76	13	59	34	22	43	32	46	41	73	5.45	+ 1.8	14	4,329	nw.	28	se.	24	10	5	13	5.9	
Sacramento	71	106	117	30.03	30.11	.00	51.8	+ 2.0	72	15	60	35	9	43	26	48	43	72	3.19	0.0	9	5,288	se.	30	sw.	7	7	11	10	5.9	
San Francisco	153	161	167	29.96	30.12	+ .02	52.6	+ 0.9	70	14	58	43	22	47	19	49	46	82	2.13	— 1.6	11	5,598	w.	36	se.	27	11	8	9	5.2	
Point Reyes Light	.....	12	....	.....	.....	.....	49.5	+ 0.2	66	4	54	41	*	45	23	....	....	....	4.48	+ 0.7	14	.....	nw.	...	.....	...	7	8	13	....	
S. Pac. Coast Reg.							55.8	+ 2.4										71	0.93	— 1.6										4.0	
Fresno	332	67	70	29.73	30.08	— .02	53.8	+ 3.6	76	15	64	33	22	43	32	48	42	69	1.15	0.0	8	3,278	nw.	28	sw.	24	17	4	7	4.0	
Los Angeles	330	74	82	29.73	30.08	.00	57.8	+ 3.4	85	14	69	40	9	47	35	50	45	71	0.51	— 2.8	4	2,588	w.	17	w.	9	11	12	5	4.4	
San Diego	87	94	102	29.97	30.07	— .02	55.2	+ 0.4	75	14	62	42	4	48	23	50	46	75	0.06	— 2.2	1	3,738	nw.	23	nw.	28	23	2	3	3.0	
San Luis Obispo	201	10	46	29.90	30.12	.....	56.3	+ 0.2	84	14	68	36	5	45	39	49	44	70	2.20	— 1.6	8	3,886	n.	28	s.	24	13	5	10	4.6	

NOTE.—The data at stations having no departures are not used in computing the district averages. Letters of the alphabet denote number of days missing from the record. *Two or more dates. †Received too late to be considered in departures, etc.

TABLE II.—*Meteorological record of voluntary and other cooperating observers, February, 1898.*

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Alabama.	°	°	°	*Ins.*	*Ins.*
Alco†	76	19	50.4	6.82	
Ashville†	72	14	43.4	0.80	T.
Bermuda†	77	20	50.6	4.29	T.
Birmingham†	73	16	47.0	1.15	
Bridgeport†				0.96	0.5
Citronelle†	72	27	53.6	4.75	
Clanton†	70	20	46.0	0.39	T.
Daphne†	75	25	51.6	4.83	
Decatur†	71	10	41.4	1.13	T.
Demopolis				1.64	
Elba†				3.56	
Eufaula *a*†	75	18	47.8	2.01	
Eufaula *b*				2.28	
Florence *a*†				1.89	
Florence *b*†	73	14	43.8	1.67	T.
Fort Deposit	73	22	48.2	3.25	
Gadsden	70	14	43.0	0.71	
Goodwater	71	18	44.0	0.75	
Greensboro†	75	21	47.3	1.77	T.
Hamilton	70	15	42.5	1.49	T.
Healing Springs†	78	17	50.7	4.15	
Highland Home†	73°	24°	50.7°	2.89	T.
Jasper	74	14	42.1	0.95	T.
Livingston	74	21	48.2	2.18	T.
Lock No. 4	70	16	41.6	0.69	T.
Madison Station†	71	10	42.1	1.43	
Marion†	73	20	47.2	1.33	T.
Mount Willing†	79	18	50.9	2.80	
Newbern†	74	20	47.4	2.01	
Newburg				0.98	T.
Newton†	74	19	47.0	2.68	
Oneonta	67	12	42.5	0.84	T.
Opelika†	72	18	49.3	1.85	
Oxanna†	68	12	43.2	0.80	1.0
Pineapple	70	15	43.7	4.75	T.
Pushmataha†	76	21	49.8	3.24	T.
Riverton†	73	12	41.1	2.64	
Rockmills†	82	14	48.2	1.05	
Scottsboro†	66	14	40.7	1.06	T.
Selma†	79	22	47.9	2.19	
Sturdevant				1.14	
Talladega	71	17	44.8	0.77	T.
Tallassee				1.91	
Thomasville	74	22	48.0	3.35	T.
Tuscaloosa†	70	22	45.9	1.46	
Tuscumbia	70	14	47.5	2.02	
Union†	75	18	47.8	1.89	T.
Union Springs†	72	20	47.2	2.65	T.
Uniontown†	74	24	49.6	1.32	
Valleyhead	68	11	40.0	1.32	T.
Warrior				0.94	
Wetumpka	72	20	46.4	2.15	
Wilsonville†				0.81	
Arizona.					
Arizona Canal Co. Dam	92	39	59.4	0.00	
Benson*§	73	36	56.3	0.00	
Bisbee†	71	34	51.0	0.26	
Buckeye†	90	30	59.8	0.00	
Calabasas	75	30	51.9	0.00	
Casa Grande*§	70	45	57.5	0.00	
Cedar Springs	76	29	50.6	0.06	
Congress	76	41	58.6	T.	
Dragoon				0.00	
Dragoon Summit*§	70	30	51.0	0.00	
Dudleyville	80	30	53.6	0.10	
Empire Ranch	70d	30	48.2	0.00	
Flagstaff†	65	4	35.2	0.45	4.5
Fort Apache	65	18	42.0	1.50	
Fort Defiance	56	4	33.2	0.25	2.5
Fort Grant†	74	32	52.4	T.	
Fort Huachuca†	74	31	51.2	0.39	
Fort Mohave	87	37	59.4	0.00	
Gilabend *a**§	84	38	59.7	0.00	
Gisela	75	24	50.6	0.34	
Holbrook†	71	11	37.4	0.11	T.
Jerome	82	32	52.4	0.15	
Lochiel*‡	71	31	49.0	0.14	
Maricopa*§	92	40	64.9	0.00	
Mesa†	80	38	57.2	T.	
Mount Huachuca	74	27	49.2	0.17	
Music Mountain	76	25	49.4	0.63	
Natural Bridge				0.60	
Oracle	79	30	52.0	0.00	
Oro				0.00	
Oro Blanco	75	30	52.7	0.00	
Pantano*§	82	38	58.0	0.13	
Parker	89	33	59.2	0.01	
Payson				1.00	
Peoria†	79	36	57.9	T.	
Phœnix	81	29	56.0	0.00	
Pinal Ranch				0.21	
St. Helena Ranch				0.19	
San Carlos†	82	29	53.8	0.00	
San Simon*§	80	30	51.3	0.00	
Showlow				0.22	7.5
Signal†	80	35	55.8	T.	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
***Arizona*—Cont'd.**	°	°	°	*Ins.*	*Ins.*
Snowflake	64	9	36.6	0.20	T.
Strawberry	65	20	41.0	0.59	3.7
Sulphur Spring Valley				0.06	
Texas Hill*§	90	31	53.5		
Tombstone	74	32	52.8	T.	T.
Tuba	63	0	34.0	0.12	T.
Tucson *c*†	83	32	57.2	0.00	
Walnut Grove				0.18	
Whipple Barracks†	70	19	42.9	0.17	
White Hills	75	33	54.0	0.60	
Willcox*§	65	30	42.1	0.00	
Williams	60	8	35.5	0.30	3.0
Arkansas.					
Amity	70	18	46.8	1.49	T.
Arkansas City†				2.75	
Beebranch†	69	10	44.8		
Blanchard Springs†	74	23	49.2	3.12	
Brinkley	68	18	46.4	1.95	
Camden *a*†				2.25	
Camden *b*†	72	20	50.6	2.33	
Canton*‡	69	10	40.5		T.
Conway	72	15	46.6	1.35	
Corning	71	10	41.1	4.76	T.
Dallas	68	14	46.6	2.13	
Dardanelle				1.23	
Elon†	73	19	50.2	1.98	
Fayetteville†	67	9	42.6	0.73	
Forrest	70	17	44.6	2.35	
Fulton†				1.54	
Hardy	68	9	40.7	2.33	T.
Helena *a*†				2.04	T.
Helena *b*	70	19	48.8	1.79	
Hot Springs *a*	71	16	48.8	1.02	
Hot Springs *b*				1.06	
Jonesboro	69	14	42.2	3.10	
Keesees Ferry†	70	8	42.0	1.36	T.
Lacrosse†	67	11	42.2	1.48	
Lonoke*‡	72	20	46.4	1.38	
Luna Landing*§	65	22	47.8	3.14	
Lutherville*‡	70	14	46.4		
Magnolia	82	21	52.1	1.58	T.
Malvern†	74			2.06	
Marianna*‡	68	20	47.3		
Marvell	70	18	47.2	1.87	
Mena*‡	72	12	48.2	1.78	T.
Monticello	69	18	47.8	2.64	
Moore				3.33	
Mossville	64	11	40.9	1.21	
Mount Nebo†	64	17	43.8	1.70	T.
New Gascony*‡	70	19	46.3	2.27	
Newport *a*†				2.64	
Newport *b*†	70	13	42.5	2.53	
Newport *c*†	71	13	44.2	2.99	T.
Oregon*‡	60	10	39.2		T.
Osceola	68	15	43.2	3.47	
Ozark†	69	14	46.8	1.25	
Picayune†	74	14	48.0	2.43	T.
Pinebluff†	75	20	48.9	2.37	
Pocahontas†	68	22	42.2	5.28	T.
Powell *†‡	66	12	42.2	1.25	
Prescott				2.11	
Rison	74	24	47.7	2.40	
Russellville	79	16	43.9	2.43	
Silver Springs†	70	9	41.4	0.47	T.
Spielerville	70	15	46.2	1.83	
Stamps	76	20	51.5	1.63	T.
Stuttgart†	69	17	46.2	2.18	
Texarkana†	78	18	50.2	2.11	
Warren†	71	19	47.6	3.98	
Washington *†‡	72	20	50.4	1.95	T.
Wiggs*‡	72	16	49.0	1.30	
Winslow	63	7	40.7	0.89	
Witts Springs†	62	9	40.9	1.24	
California.					
Agnew	72	30	52.7	1.69	
Arlington Heights	86	36	57.3	0.12	
Athlone*§	72	35	48.8	0.92	
Ballast Point L. H				0.16	
Bear Valley				10.44	43.0
Berkeley	69	38	51.8	3.28	
Bishop†	74	19	43.6	0.13	
Boca*§	60	10	32.2		
Bodie†	47	— 1	26.8	0.77	6.0
Bowmans Dam *†‡	80	19	38.3	12.23	62.0
Caliente*§	70	36	52.4	0.70	
Campbell	75	29	51.4	2.40	
Cape Mendocino L. H				8.10	
Castle Pinckney*‡	81	43	55.5	1.55	
Cedarville†	59	12	36.4	0.94	6.0
Centerville*‡	76	40	56.2	2.20	
Chico*§	76	36	53.2	5.30	
Chino*§	82	34	56.2	0.58	
Claremont†	80	35	54.1	0.97	
Corning*§	71	32	44.7	3.20	
Craftonville	80	36	54.1	0.93	
Crescent City†	62	29	48.4	13.00	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
***California*—Cont'd.**	°	°	°	*Ins.*	*Ins.*
Crescent City L. H				12.89	
Daunt				1.27	
Delano*§	76	37	54.7	0.62	
Delta*§	74	30	42.4	13.55	
Descanso*§	72	22	50.8	0.89	
Drytown	74	31	49.6	4.64	
Dunnigan*§	72	35	47.7	3.24	
Durham*‡	70	36	53.5	5.54	
East Brother L. H				2.55	
Edmanton*‡	64	22	38.4	12.74	28.0
Elsinore	89	30	56.8	0.15	
Escondido	80	27	52.2	0.68	
Fordyce Dam				7.78	61.0
Fort Bragg†				7.50	
Fort Ross	69	37	50.8	12.94	
Fort Tejon				1.55	
Georgetown	70	30	47.6	8.83	
Goshen*§	76	32	51.6	0.93	
Grand Island*§	70	37	52.5	2.51	
Grass Valley				8.64	
Greenville†	68	20	40.9	7.97	9.5
Healdsburg*‡	68	33	49.6	8.71	
Hill Ranch				1.45	
Hollister	77	29	52.7	1.04	
Humboldt L. H				8.25	
Indio*§	89	39	58.8	0.00	
Iowa Hill*‡	68	33	45.0	8.10	
Jackson	74	30	49.6	4.91	
Jolon				2.10	
Keene*§	65	28	45.9	0.75	
Kennedy Gold Mine	71	32	49.3	6.05	
Kernville				0.85	
King City*§	78	32	48.7	1.30	
Kingsburg*§	70	33	52.9	0.94	
Kono Tayee	64	34	48.0	4.19	
Lagrange*§	77	32	55.8	1.92	
Laporte*†‡	59	18	36.8	13.04	61.5
Las Fuentes Ranch				1.03	
Lemoore *a*§	72	34	52.8	0.43	
Lick Observatory	65	27	42.8	4.16	0.5
Limekiln	78	36	55.3		
Lime Point L. H				2.50	
Lodi	74	29	52.6	1.71	
Los Alamos				0.64	
Los Gatos *b*	67	37	50.4	6.38	
Lytton Springs	64	35	49.1	7.30	
McMullin*‡	74	32	52.5	1.00	
Malakoff Mine*‡	72	28	45.7	13.03	8.0
Mammoth Tank*§	87	47	56.1	0.00	
Manzana	75	27	45.0	0.02	
Mare Island L. H				2.58	
Merced*§	72	33	53.4	1.18	
Mills College				3.10	
Milton (near)*‡	73	33	53.5	4.03	
Modesto*§	84	36	55.4	0.71	
Mohave*§	76	30	51.4	T.	
Mokelumne Hill*§		38	47.4	4.45	
Mount Tamalpais	67	31	46.4	6.69	
Mutah Flat				1.00	
Needles	81	41	61.4	0.00	
Nevada City	68	27	45.4	9.91	
Newhall*§	85	29	51.3		
North Ontario	78	34	53.6	1.11	
North San Juan*‡	72	32	48.2	8.72	
Oakland *a*	70	38	51.4	2.85	
Ogilby*§	80	50	61.4	0.00	
Oleta*‡	68	32	47.4	5.80	
Orangevale†	69	30	51.4	3.98	
Orland*§	75	37	50.2	3.64	
Oroville *b*	78	32	52.2	6.03	
Paso Robles *b*	73	30	51.0	1.55	
Peachland*§	74	32	51.7	8.28	
Piedras Blancas L. H				2.06	
Pigeon Point				0.97	
Pilot Creek				9.44	16.5
Pine Crest	80	43	57.9		
Placerville	66	27	46.4	6.18	
Point Ano Nuevo L. H				0.96	
Point Arena L. H				7.14	
Point Bonita L. H				3.44	
Point Conception L. H				1.06	
Point Fermin L. H				0.25	
Point George L. H				5.43	
Point Hueneme L. H				0.54	
Point Lobos	64	48	50.4	2.64	
Point Loma L. H				0.00	
Point Montara L. H				3.81	
Point Pinos L. H				2.18	
Point Reyes L. H				4.48	
Point Sur L. H				1.89	
Pomona (near)	84	33	55.9	0.81	
Poway*§	82	32	47.4	0.22	
Quincy†	60	25	40.0	10.08	8.0
Redding *b*†	75	33	50.2	3.77	
Represa	64	34	50.0	4.31	
Rio Vista	73	35	52.8	1.89	

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
California—Cont'd.	°	°	°	*Ins.*	*Ins.*
Roe Island L. H	.....	.....	.....	1.53	
Rosewood	75	23	46.2	3.80	
Sacramento *a*	70	36	52.4	3.46	
Salinas *[2]	77	31	55.2	1.58	
Salton *[2]	95	32	49.6	0.00	
San Bernardino †	85	33	56.2	0.60	
San Jacinto	83	29	53.6	0.49	
San Leandro *[1]	79	40	55.9	2.66	
San Luis L. H	.....	.....	.....	2.15	
San Mateo *[2]	69	37	52.6	3.04	
San Miguel *[2]	76	31	49.9	1.17	
Santa Barbara *a*	82	40	55.9	0.97	
Santa Barbara L. H	.....	.....	.....	0.78	
Santa Clara *a*	.....	.....	.....	2.12	
Santa Cruz *b* †	81	30	52.5	2.67	
Santa Cruz L. H	.....	.....	.....	2.79	
Santa Maria	78	33	56.5	1.06	
Santa Monica *[2]	76	34	57.6	0.31	
Santa Paula	84	36	54.4	0.70	
Santa Rosa *[2]	68	35	52.5	5.32	
Saticoy	.....	.....	.....	0.92	
Shasta	.....	.....	.....	8.39	
Sierra Madre	79	40	56.6	0.41	
Sneddens Ranch *[1]	66	10	33.1	0.41	
S. E. Farallone L. H	.....	.....	.....	3.07	
Stanford University [1]	70*	34	50.0	1.84	
Stockton *a*	73	34	51.8	1.32	
Summerdale †	62	23	39.3	7.25	9.0
Susanville †	57	16	36.4	2.38	12.5
Sutter Creek *[2]	66	26	44.3	5.28	
Tehama *[2]	69	37	51.1	3.20	
Templeton *[2]	78	30	44.5	1.83	
Trinidad L. H	.....	.....	.....	7.34	
Truckee *[2]	50	16	32.6	3.65	34.0
Tulare *b*	.....	.....	.....	0.82	
Tulare *c*	84	32	56.1	0.97	
Turlock	75	40	54.7	0.68	
Ukiah †	71	26	48.6	7.08	
Upperlake	74	25	47.2	4.57	
Upper Mattole *[1]	78	32	52.1	22.25	
Vacaville *a* *[1]	74	37	51.0	3.01	
Ventura †	83	32	51.8	0.74	
Visalia	76	27	51.1	0.96	
Volcano Springs *[2]	92	46	66.2	0.00	
Walnut Creek	73	33	52.4	3.16	
West Palmdale *[1]	74	25	47.4	0.07	
Westpoint	.....	.....	.....	4.71	
Wheatland †	68	31	50.1	4.25	
Williams *[2]	70	37	52.2	2.32	
Wilmington *[5]	79	47	63.8	T.	
Wire Bridge *[5]	72	32	50.4	6.58	
Yerba Buena L. H	.....	.....	.....	1.94	
Yreka †	59	22	41.0	1.44	
Yuba City *[5]	66	45	53.2	4.36	
Colorado.					
Altman	45	3	23.8	0.31	3.6
Antlers †	58	8	31.1	0.10	2.0
Arkins	.....	.....	.....	0.25	3.0
Boulder	63	17	38.8	0.55	4.2
Boxelder	.....	.....	.....	0.22	2.0
Breckenridge †	52	−22	16.2	0.59	7.2
Canyon †	66	6	40.4	0.39	5.5
Cedaredge	60	3	32.0	0.50	5.0
Cheyenne Wells	70	4	34.8	0.00	0.0
Collbran	.....	.....	.....	0.27	4.5
Colorado Springs †	65	12	34.7	0.21	3.2
Cope	68	7	35.9	0.01	T.
Crook	63	3	32.0	0.07	0.8
Delta	63	− 1	31.2	0.10	1.5
Dumont †	.....	.....	.....	0.90	9.0
Durango	59	15	35.0	0.45	5.5
Fleming	.....	.....	.....	0.20	2.0
Fort Collins †	64	7	34.1	0.08	0.8
Fort Morgan	60	5	33.8	0.01	T.
Fox	.....	.....	.....	0.25	T.
Garnett	58	− 4	24.4	0.05	0.5
Georgetown	56	10	31.1	.....	.....
Gleneyrie †	63	11	35.4	0.18	.....
Grand Junction †	57	− 1	28.7	T.	T.
Greeley †	63	10	34.6	0.33	1.5
Gulch †	52	11	28.8	0.53	7.5
Gunnison	55	−19	23.3	0.31	3.2
Hamps	67	4	32.8	0.02	0.2
Hoehne	64	3	35.2	1.01	.....
Holly	.....	.....	.....	T.	T.
Holyoke	.....	.....	.....	0.05	0.5
Holyoke (near)	64	1	36.0	0.12	1.5
Hugo	.....	.....	.....	0.00	0.0
Husted †	65	3	35.0	0.15	2.5
Lake Moraine †	48[1]	− 1[1]	26.3[1]	0.37	6.0
Lamar †	77	12	38.9	0.00	0.0
Laporte	.....	.....	.....	0.10	1.0
Las Animas †	73	12	40.0	0.00	0.0
Leadville (near) *† [1]	43	2	22.4	0.62	9.8
Leroy †	65	4	35.1	0.26	2.8
Longs Peak	52	0	26.8	0.83	9.0
Manitou Park	55	3	30.5	0.27	3.0
Millbrook	56	− 9	26.3	0.90	10.0
Minneapolis †	77	4	40.2	0.05	0.5
Moraine †	48	0	30.4	1.05	10.5
Pagoda †	51	−10	25.1	0.80	8.0
Paonia †	.....	.....	.....	0.41	4.8
Parachute †	56	.....	.....	0.00	0.0
Rangely †	43	−23	14.1	0.42	6.0
Redcliff	.....	.....	.....	0.63	6.5
Rico	46	− 2	25.4	1.35	13.5
Rockyford	74	12	38.4	0.00	0.0
Ruby	.....	.....	.....	2.54	25.5
Saguache †	54	2	28.5	0.10	1.0
Salida	64	8	33.8	1.00	10.0
San Luis †	58	−10	27.2	0.05	0.5
Santa Clara *[1]	57	8	30.6	1.80	19.0
Seibert †	.....	.....	.....	T.	T.
Smoky Hill Mine	59	3	33.8	0.90	9.0
Springfield	.....	.....	....	0.09	1.1
Stamford *[1]	52	0	30.1	1.83	18.5
Steamboat Springs	49	−18	20.0	0.47	5.0
Strickler Tunnel	.....	.....	.....	0.59	8.5
T. S. Ranch †	57	10	31.3	0.07	0.9
Vilas	.....	.....	.....	0.02	0.2
Wagon Wheel	43	−16	13.5	0.65	8.0
Walden	50	− 8	20.6	0.17	2.5
Wallet	.....	.....	.....	T.	T.
Wray †	68	4	33.9	0.07	0.8
Yuma	.....	.....	.....	0.20	2.0
Connecticut.					
Canton †	54	−11	27.2	4.12	3.0
Colchester	54	− 3	30.5	4.80	10.0
Falls Village	.....	.....	.....	3.06	11.5
Hartford *a*	49	− 4	29.4	5.19	.....
Hartford *b*	.....	.....	....	5.89	7.0
Lake Konomoc	.....	.....	.....	6.07	.....
Middletown	53	−12	30.2	5.98	13.0
New London †	49	3	29.0	4.01	12.0
North Grosvenor Dale	51	−16	27.7	3.17	2.0
Norwalk	54	−13	29.0	3.39	.....
Pomfret	51	− 5	28.4	3.67	T.
Southington	52	−12	28.5	4.90	9.5
South Manchester	.....	.....	.....	4.91	12.0
Storrs	51	− 4	27.6	4.03	5.1
Voluntown †	57	−14	30.3	5.12	10.5
Waterbury	55	− 6	29.8	3.49	4.0
West Cornwall †	50	− 6	26.6	3.68	15.8
West Simsbury	.....	.....	.....	6.00	21.0
Windsor	50	−10	27.0	6.03	13.0
Winsted *[1]	50	− 8	25.8	.....	.....
Delaware.					
Dover	63	6	34.8	2.35	.....
Milford	65	10	38.9	1.68	T.
Millsboro	64	10	36.5	1.24	T.
Newark	61	0	33.2	2.94	T.
Seaford	65	11	36.6	1.81	T.
District of Columbia.					
Distributing Reservoir *[5]	63	6	34.2	1.37	.....
Receiving Reservoir *[5]	63	4	33.7	1.45	.....
West Washington	70	3	34.4	1.80	T.
Florida.					
Archer †	80	28	55.9	3.31	
Bartow	84	30	59.4	0.87	
Boca Raton †	84	41	65.9	1.82	
Brooksville †	79	29	57.4	1.97	
Carrabelle †	72	27	53.4	4.30	
Clermont †	83	34	61.4	0.81	
De Funiak Springs	77	20	51.4	5.47	
Earnestville	82	28	59.6	1.18	
Eustis †	83	28	59.0	1.43	
Federal Point †	79	31	55.8	1.09	
Fort Meade	86	27	59.0	0.57	
Frostproof	89	32	63.0	0.14	
Gainesville	77	26	55.4	3.49	
Grasmere †	80	29	57.9	1.13	
Haywood	74	25	52.5	3.50	
Huntington	78	34	58.6	1.34	
Jasper	80	21	52.7	1.35	
Kissimmee	81	32	60.5	1.12	
Lake Butler	80	24	56.4	4.78	
Lake City †	79	24	55.2	4.04	
Lemon City	85	40	66.2	2.45	
Macclenny †	80	22	54.6	3.12	
Manatee	83	31	59.5	0.81	
Merritts Island	79	36	61.4	1.22	
Myers †	85	37	63.3	0.02	
New Smyrna	77	31	57.8	1.52	
Ocala †	80	28	57.8	1.38	
Orange City	80	29	57.4	1.96	
Orange Park	76	26	55.0	2.18	
Orlando †	80	30	59.0	1.26	
Oxford *† [1]	78	30	56.1	0.96	
Plant City	85	29	59.1	0.47	
St. Andrews	72	27	53.1	5.52	
St. Francis †	81	29	57.1	1.07	
St. Francis Barracks	76	28	54.5	0.68	
Sebastian	82	42	64.0	1.09	
Switzerland *[1]	77	29[c]	52.5[c]	2.01	
Tallahassee †	78	26	53.9	3.06	
Tarpon Springs †	81	28	58.1	1.50	
Wausau	77	21	50.6	5.15	
Georgia.					
Adairsville †	65	13	40.3	0.73	T.
Alapaha	76	19	47.8	0.99	
Albany †	79	20	55.2	2.06	
Allentown †	76	16	47.8	1.02	T.
Americus †	76	17	48.2	1.64	T.
Athens †	68	16	41.0	0.66	
Belleville	77	15	49.7	0.76	
Blakely †	74	24	50.6	2.13	
Brag	78	14	48.1	0.80	
Canton †	.....	.....	.....	1.04	T.
Cartersville	65	14	40.0	0.64	0.5
Cedartown	66[c]	16[c]	41.8[c]	0.52	
Clayton †	65	10	37.9	1.50	0.8
Columbus	70	22	47.3	1.10	
Covington	70	14	41.6	1.06	T.
Crescent	76	23	51.0	0.50	
Dahlonega †	69	7	40.6	1.38	1.5
Diamond	63	5	36.9	0.78	6.0
Elberton †	74	15	43.2	1.14	
Fleming †	78	16	49.0	0.38	
Fort Gaines	74	19	48.4	2.47	
Franklin	69	19	46.4	1.03	T.
Gainesville	67	14	39.5	0.79	
Gillsville †	72	14	43.1	0.36	
Greenbush	66	11	39.6	0.90	0.5
Hawkinsville	77	9	44.8	1.90	
Hephzibah *† [6]	76	22	49.7	0.40	
Jesup	74	20	50.2	0.38	
Lagrange †	72	16	46.6	0.87	
Lawrenceville	62[d]	12[d]	43.0[d]	0.90	
Louisville	76	17	48.4	0.63	
Lumpkin	72	19	49.7	2.40	
Marietta	66	12	41.4	0.68	
Marshallville †	74	21	48.7	1.19	
Morgan †	75	17	48.3	2.70	
Mount Vernon	74	22	47.4	1.50	
Piscola	77	23	53.0	2.05	
Point Peter	64	14	39.2	0.70	T.
Poulan †	78	18	49.1	1.73	
Quitman †	83	19	52.1	1.82	
Ramsey	68	11	42.2	0.68	0.5
Resaca	.....	.....	.....	1.00	0.5
Reynolds	.....	.....	.....	1.23	
Rome †	82	15	41.0	0.86	0.5
Talbotton †	72	20	46.9	1.08	T.
Tallapoosa	67	13	41.7	0.76	T.
Thomasville †	76	23	52.5	1.61	
Toccoa †	69	14	41.4	0.69	
Washington †	.....	.....	.....	0.34	
Waycross	76	23	50.0	0.61	
Whitesburg †	.....	.....	.....	0.80	
Idaho.					
American Falls	51	8	30.8	0.25	.....
Blackfoot †	64	1	30.2	0.65	0.5
Boise Barracks †	62	7	38.4	1.61	1.0
Burnside †	50	− 1	26.0	0.36	.....
Challis	60	4	33.2	1.32	4.0
Cœur d'Alene	52	10	35.1	.....	.....
Corral *[1]	45	− 5	23.3	1.00	10.0
Downey	48	− 4	30.4	0.10	1.0
Fort Sherman †	54	7	35.0	4.23	7.1
Gimlet †	50	− 1	26.2	1.74	8.0
Gray	50	−12	24.1	0.80	8.0
Idaho City †	56[d]	3[d]	31.3[d]	2.04	7.1
Jansville	55	10	32.2	1.30	.....
Kootenai †	54	17	34.0	3.09	14.0
Lake	30	−18	11.2	1.30	13.0
Lakeview	54	19	36.6	3.58	5.0
Lewiston	62	22	43.8	1.19	0.0
Lost River	45	− 6	22.5	0.02	0.2
Marysville	49	−10	24.4	1.90	19.0
Minidoka	57	− 3	29.4	0.50	.....
Moscow	55	18	35.6	2.04	1.5
Murray †	50[f]	10	33.2	6.99	20.0
Nampa	61	4	37.6	0.40	T.
New Plymouth	58	5	36.8	.....	.....
Oakley	58	12	35.4	0.30	1.0
Ola †	52	− 1	33.2	1.57	2.5
Paris	49	−12	20.1	0.34	4.8
Pavette †	60	4	38.2	0.68	0.5
Pollock †	69	23	43.1	1.15	.....
Rexburg	45	− 6	22.7	.....	.....
Roseberry	45	12	30.4	0.20	0.3
St. Maries	57	19	37.6	3.95	10.0
Salubria	54	− 2	31.1	2.12	4.5
Soldier †	50	−14	23.4	0.51	5.0
Swan Valley †	46	−14	25.9	0.62	2.1
Warren †	51	− 6	31.8	2.23	.....
Yellow Jacket	.....	.....	.....	1.63	.....

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Illinois.	°	°	°	*Ins.*	*Ins.*
Albion†	65	1	33.4	1.91	1.5
Alexander†	67	— 4	33.6	2.81	7.0
Ashton*†[1]	48	—10	24.5	2.14	11.4
Aurora *a*	53	—10	26.0	3.21	12.4
Aurora *b*	52	—10	25.0	3.19	13.8
Bloomington†	67	— 8	30.2	1.77	2.0
Bushnell†	63	— 5	31.1	1.64	1.0
Cambridge	55	— 6	26.4	1.77	12.2
Carlinville†	69	— 2	35.5	1.96	3.5
Carlyle				1.76	
Carrollton [2]	69	2	32.8	2.00	1.5
Charleston	66	— 2	32.7	1.38	3.1
Chester				1.98	
Cisne†	71	3	36.5	1.20	0.5
Coatsburg	61	— 4	30.6	2.26	5.0
Cobden†	70	5	38.1	1.37	0.3
Danville	65	— 6	31.4	1.79	3.7
Decatur†	68	— 4	32.4	2.71	3.5
Dixon†	53	— 9	24.4	2.26	16.5
Dwight†	60	— 8	27.9	2.07	3.8
East Peoria†	66	— 7	32.8	2.16	
Effingham†	67	— 1	34.8	1.65	4.3
Elgin	51	—10	24.9	2.44	13.6
Fort Sheridan†	56	— 8	25.0	2.91	19.8
Friendgrove†				1.86	1.2
Galva†	58	—11	26.4	1.43	7.0
Glenwood*†[1]	60	— 4	28.0	2.11	
Golconda†	71	4	39.0	1.25	
Grafton†				1.30	1.2
Grayville	69	7	39.7	1.79	3.0
Greenville†	64	0	33.0	4.23	1.7
Griggsville†	68	— 2	33.7	2.19	6.0
Halliday*[3]	69[d]	10[d]	39.0[d]	1.41	T.
Havana†	67	— 1	33.9	2.08	4.0
Hillsboro†	69	— 3	34.8	3.07	2.5
Joliet†	62	— 8	28.9	2.28	5.4
Jordans Grove†	67	7	37.2	1.94	0.4
Kankakee *a*	62	— 6	31.4		
Kishwaukee	50	—12	23.4	2.12	16.2
Knoxville *a*	61	—10	28.2	1.86	7.4
Lagrange†	55	—10	26.5	2.60	7.5
Laharpe[4]	54	—10	28.3	1.40	8.2
Lanark†	49	—10	22.7	1.52	13.3
Lexington	65	— 6	29.8	2.11	
Loami†				2.31	1.0
McLeansboro†	70	4	37.2	1.29	1.5
Martinsville†	67[c]	6[c]	33.6[c]	1.36	3.0
Martinton†	64	— 5	28.6	1.90	
Mascoutah	68	5	36.0	2.89	1.3
Mattoon	65	0	34.1	1.58	
Minonk†	63	— 9	28.0	1.78	3.8
Monmouth†	57	—10	27.0	1.38	6.8
Morrisonville†	68	— 4	33.2	2.74	1.7
Mount Carmel†				1.79	0.4
Mount Pulaski	68	— 4	32.8	2.20	7.5
Mount Vernon	70	4	35.1	1.60	3.0
New Burnside†	70	5	38.6	1.07	T.
Oswego*[1]	55	— 9	24.9	2.59	2.8
Ottawa†	59	— 8	27.7	2.38	6.2
Palestine†	68	— 4	35.0	1.56	3.0
Paris[4]	65	9	33.0	1.69	
Peoria *a*†				2.82	9.0
Peoria *b*†	65	— 2	31.3	2.59	5.0
Philo†	66	— 5	31.2	1.28	1.8
Plumhill†	70	7	35.6	2.06	0.6
Rantoul†	61	— 8	29.9	1.76	2.7
Reynolds	54	— 9	25.6	1.30	8.0
Riley†	47	—13	23.1	3.03	15.0
Robinson†	65	1	33.8	1.73	2.0
Rockford	54			2.52	19.0
Roundgrove†	50	—11	24.8	1.82	16.1
St. Charles*†[1]	50	— 5	25.8	2.89	10.8
St. John†				1.32	
Scales Mound	49	—16	22.2	1.76	16.4
Streator†	64	— 3	29.8	1.62	6.5
Sycamore†	49	— 9	23.6	3.57	19.0
Tiskilwa†	55	—12	26.5	2.43	7.5
Tuscola†	67	— 5	31.4	1.63	2.4
Walnut†	51	—11	26.6	2.08	8.6
Wheaton*[3]		— 4	34.3	2.20	11.9
Winchester*[1]	64	0	32.5	2.90	2.2
Winnebago†	48	—10	23.2	3.07	23.0
Zion†	50	—15	24.6	2.80	24.0
Indiana.					
Anderson†	66	— 5	30.8	1.56	6.2
Angola*[1]	58	— 5	28.2	2.59	12.1
Auburn	62	— 6	28.1	1.73	
Bloomington†	68	1	33.1	2.15	4.2
Bluffton†	65	— 7	29.3	2.32	12.5
Boonville	69	5	39.4	0.94	0.4
Bright†	63	— 2	33.0	1.56	2.0
Butlerville†	67	— 2	34.0	1.86	4.7
Cambridge City†	66	— 6	31.5	1.46	2.8
Columbia City*[1]	58	— 3	28.3	2.11	11.5
Columbus†	69	4	34.0	1.50	3.0
Connersville†	65	— 6	31.3	1.25	1.6
Indiana—Cont'd.					
Delphi†	67	— 6	29.5	1.39	4.5
Edwardsville*†[1]	66	2	37.7	2.10	3.4
Farmland†	64	— 4	32.2	3.24	4.5
Fort Wayne	65	— 8	29.4	2.22	9.0
Franklin*[1]	67	3	33.6	1.59	3.2
Greencastle†	66	0	31.7	2.70	4.5
Hammond†	58	— 6	29.1	0.91	7.0
Hector				2.88	7.0
Huntington	64	— 5	29.1	2.13	7.7
Jasper†	68	2	36.6	2.15	5.5
Jeffersonville	66	6	37.5	1.65	1.5
Knightstown†	66	— 6	31.8	2.29	4.5
Kokomo†	65	— 3	31.2	1.60	4.0
Lafayette†	61	— 7	30.8	1.27	2.9
Laporte	53	0	26.5	2.41	
Logansport *b*†	63	— 4	30.5	0.85	4.8
Madison	68	2	35.4	1.65	4.0
Marengo†	68	0	36.8	2.37	3.4
Marion†	66	— 6	30.8	1.75	4.5
Markle	62			1.51	11.0
Mauzy†	66	— 6	31.3	1.80	6.2
Michigan City*[10]	58	— 2	27.6		
Mount Vernon†	72	4	37.2	1.76	2.5
Northfield†	65	— 6	30.4	2.10	4.0
Princeton*[1]	68	3	39.0	2.34	2.0
Richmond	67	— 4	31.8	1.36	
Rockport	70	5	40.8	1.72	0.6
Rockville†	66	— 5	32.9	1.74	1.0
Salem	68	— 4	33.8	2.20	6.5
Scottsburg	67	1	37.0	1.59	2.5
Seymour	68	2	33.5	1.60	2.5
Shelbyville	70	0	36.1	2.08	7.2
South Bend†	60	— 9	28.6	2.66	12.0
Syracuse†				2.60	17.0
Terre Haute†	60	— 1	33.9	1.53	2.2
Topeka†	57	— 6	27.7		
Valparaiso†	60	— 8	26.6	0.26	2.6
Vevay	65	3	36.4	2.15	5.0
Vincennes	58	2	32.9	3.03	5.0
Warsaw†	63	— 7	27.6	1.73	
Washington†	72	2	38.3		
Winamac	65	1	32.3	1.79	
Worthington†	70	— 1	35.3	1.64	2.2
Indian Territory.					
Healdton†	79	13	48.8	1.58	
Kemp	82	13	50.8	1.30	
Lehigh†	77	14	47.6	1.17	
South McAlester†				0.67	
Tahlequah	70	9	46.4	0.43	
Tulsa†				2.85	
Wagoner	70	10	40.7	1.19	
Iowa.					
Adair				0.65	1.5
Afton	47	— 6	26.6	1.51	3.0
Albia				0.88	5.0
Algona*[1]	40	—16	20.4	1.65	11.0
Alta *a*†	42	—12	21.0	0.93	7.2
Amana†	48	—15	23.4	1.11	8.1
Ames *b*	44	—10	22.6		
Ames (near)				1.42	3.8
Atlantic†	48	— 8	25.2	1.10	2.0
Audubon	47	— 9	23.9	1.10	
Belknap	50	— 7	26.2	1.77	17.5
Belleplaine	47	—15	21.8	1.30	13.0
Bonaparte†	56	—11	26.5	1.00	5.0
Britt	41	—18	19.8	1.57	5.7
Burlington	58	— 7	29.6	1.25	
Carroll	45	—10	21.2	1.10	10.5
Cedarfalls	45	—11	22.6	0.70	3.0
Cedar Rapids†	50	—12	22.8	3.65	10.4
Chariton	49	— 5	26.3	0.84	3.0
Charles City	42	—14	20.6	2.79	17.5
Clarinda†	52	— 5	29.9	2.13	4.2
Clinton	55	— 8	25.4	2.37	17.0
College Springs	51	— 4	28.1	1.11	2.0
Corning†	51	— 7	28.4	1.25	T.
Council Bluffs	51[f]	— 1	29.8[e]	0.42	
Cresco†	45	—15	19.8	1.02	8.2
Decorah†	44	—12	20.7	1.29	16.5
Delaware*[3]	45	—10	20.4	1.04	11.0
Denison†		— 7		0.10	1.0
Desoto	52	—10	25.5	1.44	4.2
Dows	42	—17	20.4	1.65	9.0
Eaglegrove				0.90	9.0
Eldora	45	—16	22.4	2.10	16.0
Elkader†	46	—13	22.8	1.09	13.8
Estherville	46	—15	20.2	0.65	6.5
Fairfield†	53	—13	26.5	0.85	6.0
Fayette†	46	—16	21.4	2.63	16.0
Forest City	45	—14	19.4	1.65	9.0
Fort Madison*†[1]	55	— 3	31.6	2.05	7.0
Fredericksburg				1.42	
Galva	43	— 9	22.6	0.44	
Glenwood†	51	— 3	30.2	1.35	2.0
Grand Meadow*[1]	40	— 7	21.1	1.95	16.8
Greene	46	—13	21.0	1.19	18.0
Iowa—Cont'd.					
Greenfield	48	— 8	26.3	1.72	2.3
Grinnell	44	— 9	24.3	0.75	4.3
Grundy Center	44	—14	21.2	0.77	7.0
Guthrie Center	45	— 7	25.3	0.97	1.4
Hampton	41	—12	20.3	1.56	12.1
Hawkeye				1.70	17.0
Hedrick*[1]	53[f]	—12	27.9[f]	0.60	
Hopeville†	48	— 6	26.1	1.16	
Humboldt†[3]	40[c]	—13	21.4	1.29	
Independence†	42	—11	20.8	1.34	13.5
Indianola†	46	— 7	25.6	0.54	4.2
Iowa City *a*	51	—12	25.0	1.15	7.0
Iowa Falls†	43	—18	20.5	2.17	17.8
Keosauqua	62[c]	— 5[c]	27.8[c]	1.46	9.7
Knoxville	49	— 6	26.6	1.04	6.0
Lamoni	50	— 7	27.3	0.92	2.0
Lansing	45	— 9	23.3	1.70	16.5
Larchwood				0.40	4.0
Larrabee†	47	—12	21.6	0.94	4.8
Lemars	43	— 8	22.8	0.45	5.0
Lenox*[1]	51	— 2	27.9	1.54	3.1
Logan†	50	— 6	26.4	0.80	4.0
Malvern				1.31	2.8
Maquoketa	49	—10	23.6	1.52	11.2
Marshall†	46	—10	24.8	0.62	3.5
Mason City	41	—15	20.4	0.95	
Millman				0.97	9.7
Monticello	46	—13	23.4	0.97	11.4
Mooar	60	— 6	28.7	1.12	
Mountayr†	50	— 7	27.3	1.41	2.0
Mount Pleasant*[1]	54	— 5	28.4	0.77	
Mount Vernon *a*[1]	48	—12	24.1		
Mount Vernon *b*	47	—12	23.2	1.46	15.1
New Hampton	54	— 9	24.4	1.60	16.0
Newton†	46	—10	24.5	0.85	5.0
Northwood	42	—13	19.8	1.95	12.0
Odebolt	42	— 9	23.1	0.95	4.2
Ogden	44	—13	22.8	1.01	5.2
Osage*[3]		—10	19.0	1.75	14.5
Osceola	47	— 7	25.8	1.18	4.5
Oskaloosa†	51	—14	25.4	0.67	4.7
Ottumwa	55	— 7	25.2	0.65	6.5
Ovid†	51	— 9	26 0	1.25	6.0
Plover	44	—13	20.8	0.60	6.0
Portsmouth				0.91	4.6
Primghar	41	—11	21.8	0.32	3.2
Red Oak	49	— 7	28.4	1.49	3.0
Rockwell City	44	—11	20.6	0.54	5.0
Ruthven	41	—13	20.8	0.85	8.5
Sac City†	42	—10	21.9	1.12	6.2
Sibley	46	—12	21.2	0.57	1.5
Sidney	50	— 4	28.6	2.38	4.1
Sigourney	52	—10	25.9	1.06	6.0
Spencer	42	—13	20.2	0.67	2.1
Spirit Lake†	48	—14	20.3	0.60	6.0
Stuart	46	—11	24.8	0.40	4.0
Tara	48	—10	23.4	1.30	11.0
Thurman	54	— 6	28.0	1.72	9.0
Toledo	44	—12	22.8	0.82	7.5
Villisca†	50	—10	27.2	1.92	3.0
Vinton*[1]	42	—11	22.9	1.65	14.5
Washington	51	—12	24.6	1.10	8.2
Washta				0.85	1.8
Waterloo	42	—10	21.7	1.19	10.0
Waverly	43	—11	22.3	1.30	10.8
Webster City	46	—12	22.3	1.04	8.5
Westbend*†[1]	40	—12	19.7	1.40	9.0
West Branch	48	—10	23.1	1.47	9.0
Whitten*[1]	40	—12	21.0	0.40	
Wilton Junction†	50	—12	25.6	1.31	8.0
Winterset†	47	— 9	25.5	1.17	0.4
Kansas.					
Abilene†	66	9	35.8	0.90	
Achilles				0.00	
Altoona*†[3]	61	14	36.2	2.56	
Anthony				1.55	
Assaria*[3]	64	8	36.4	0.90	T.
Atchison†	64	2	32.9	1.91	0.4
Augusta				2.50	
Beloit†	63	5	34.0	1.45	3.0
Burlington†[3]	65	9	37.1	2.37	
Campbell	59	1	32.7	1.26	2.0
Chanute	66[d]	12[d]	40.0[d]	1.36	
Colby†	72	3	34.8	0.02	T.
Columbus	68	9	39.8	0.84	T.
Coolidge†	71	8	37.4	0.00	
Cunningham†	72	9	38.0	0.84	1.0
Dresden	66	2	36.0	0.00	
Eldorado	66	11	38.2	2.00	
Ellinwood†	70	10	37.0	0.77	2.0
Emporia	69	10	37.6	2.00	
Englewood†	77	8	39.9	0.36	2.0
Eskridge	60	5	34.6	2.12	T.
Eureka				2.16	
Eureka Ranch†	68	6	35.0	0.25	2.5
Fallriver[4]	75	11	40.8	2.35	T.

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Kansas—Cont'd.	°	°	°	*Ins.*	*Ins.*
Fanning	61	— 7	32.0	1.81	1.0
Fort Riley †	66	7	37.0	1.50	T.
Fort Scott†	.....	9	.....	0.52	T.
Frankfort	65	3	33.9	1.80	3.0
Garden City†	73	9	36.3	0.00	
Garfield	.....	.....	.....	0.48	3.1
Gibson	74	8	36.0	0.05	T.
Gove*†	70	9	37.1	T.	T.
Grainfield*[6]	75	11	37.3	0.00	
Grenola	72	9	39.2	2.32	T.
Halstead	66	6	33.8	1.55	T.
Hays	68	.....	.....	0.25	2.5
Horton	60	2	32.8	1.90	2.0
Hoxie	69	2	34.6	0.00	
Hutchinson	73	13	40.8	0.50	T.
Lakin †	72	9	38.8	T.	
Lawrence[1]	64	6*	35.4	1.93	
Lebo†	66	10	36.6	2.46	T.
Macksville	68	14	36.7	0.00	
McPherson	71	2	35.0	1.06	
Manhattan *b*	66	9	35.8	1.37	0.2
Manhattan *c*	66	9	35.7	1.35	T.
Marion†	66	9	38.2	1.80	T.
Meade†	.....	.....	.....	0.60	6.0
Medicine Lodge†	75	15	40.0	1.15	
Minneapolis†	64	6	34.2	1.05	1.0
Morantown†	64	10	37.4	2.04	T.
Morland	74	4	35.8	0.01	
Mounthope*[1]	67	11	38.0	1.45	
Ness City	68	10	38.0	0.12	1.5
Newton	71	10	37.9	1.87	
Norton	65	5	35.8	0.01	0.1
Norwich	69[d]	14[d]	39.8[d]	1.55	T.
Oberlin	.....	.....	.....	0.00	
Olathe†	65	0	35.4	1.30	
Osage City†	66	7	36.4	1.88	
Osborne	.....	.....	.....	0.77	.....
Oswego	71	13	41.8	1.11	1.0
Ottawa	65	6	36.4	1.65	T.
Paola	.....	.....	.....	1.75	
Phillipsburg	66	4	33.2	0.15	1.5
Pleasant Dale	.....	.....	.....	1.15	5.0
Pratt	67	19	40.6	T.	
Rome*†[1]	63	14	39.3	2.58	
Russell	77	7	36.6	0.59	3.5
Salina†	67	8	34.8	0.33	0.5
Sedan†	70	12	40.1	2.06	
Seneca	64	2	34.0	1.26	1.5
Sharon Springs*[1]	82	12	43.0	.....	.....
Toronto	71	10	38.5	2.30	T.
Ulysses†	.....	.....	.....	0.12	1.2
Viroqua†	75	7	40.4	0.10	1.0
Wallace*[1]	70	10	38.4	0.00	
Wamego*[1]	62	6	34.6	1.58	T.
Wellington*[1]	66	20	43.0	2.21	T.
Winona*[1]	70	14	36.1	0.00	
Yates Center	67	7	37.2	2.42	
Kentucky.					
Alpha	.....	.....	.....	1.92	6.0
Ashland	70	— 1	36.0	1.52	1.5
Bardstown†	71	3	36.5	0.62	
Blandville†	68	6	38.2	1.27	0.2
Bowling Green *b*†	70	7	38.6	0.82	2.0
Burnside†	.....	.....	.....	1.58	2.9
Caddo	68	— 3	34.8	3.49	3.8
Canton*†[1]	73	10	42.0	0.71	T.
Carlisle	65	0	35.9	1.53	4.0
Carrollton†	70	0	36.7	1.25	1.0
Catlettsburg	.....	.....	.....	2.48	8.0
Earlington	70	11	38.4	1.35	0.6
Edmonton†	67	5	38.1	1.49	7.1
Ensor	70	4	38.2	1.60	1.5
Eubank	74	1	37.6	2.41	6.8
Falmouth†	.....	.....	.....	2.03	.....
Fords Ferry	71	8	38.9	1.07	1.0
Frankfort[f]	64	2	37.5	.....	.....
Georgetown	65	1	35.8	.....	.....
Greensburg †	77	4	37.0	1.36	1.2
Henderson †	72	9	40.6	1.23	0.8
Hopkinsville†	70	8	40.2	1.19	1.5
Irvington	69	3	37.6	1.27	1.2
Leitchfield †	67	2	35.9	1.09	3.0
Loretto	70	0	37.1	1.79	2.8
Marrowbone†	67	0	36.2	1.44	3.5
Maysville	70	— 3	35.8	2.05	0.5
Middlesboro†	67	— 1	35.5	1.08	3.5
Mount Hermon	67	3	38.2	1.27	3.5
Mount Sterling†	63	0	37.9	2.88	1.5
Owensboro†	72	7	39.8	1.44	1.0
Owenton†	65	— 1	35.5	2.25	2.5
Paducah *a*†	.....	.....	.....	0.83	0.3
Paducah *b*†	73	10	41.3	0.95	1.0
Princeton	74	22[e]	40.4[e]	1.24	2.0
Richmond †	68	1	37.6	1.83	5.5
Russellville †	71	5	41.1	1.48	2.4
St. John†	69	2	36.2	1.26	2.7

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Kentucky—Cont'd.	°	°	°	*Ins.*	*Ins.*
Sandyhook	.....	.....	.....	3.30	3.0
Scott	65	0	34.8	2.00	3.0
Shelby City	67	— 2	36.8	2.13	4.0
Shelbyville†	68	2	36.8	1.37	4.7
Southfork[5]	.....	.....	33.0	1.62	4.0
Vanceburg	66	2	32.9	2.10	T.
Williamsburg†	69	5	37.6	1.71	1.5
Woodburn*[1]	68	6	39.3	1.10	3.0
Louisiana.					
Abbeville	80	30	57.6	6.00	
Alexandria†	76	26	52.8	4.24	
Amite†	79	26	54.5	8.89	
Bastrop †	77	23	52.4	1.74	
Baton Rouge†	78	29	55.1	7.48	
Calhoun[1]	72*	22	50.6	2.95	
Cheneyville †	78	30[c]	53.8	4.40	
Clinton †	77	26	54.8	4.66	
Donaldsonville	78	30	56.1	6.20	
Elm Hall	76	31	56.2	6.22	
Farmerville	74	21	49.7	3.20	
Franklin†	76	32	55.7	8.13	
Grand Coteau	77	35	57.2	8.07	
Hammond	78	26	55.0	7.15	
Houma	79	29	57.0	7.30	
Jeanerette	80	28	57.3	.....	
Jennings	77	29	55.8	7.66	
Lafayette	84	32	60.9	4.84	
Lake Charles†	79	31	56.4	5.87	
Lawrence	74	35	56.6	8.29	
Liberty Hill	77	21	52.6	2.82	
Mansfield	75	18	50.8	3.95	
Melville	74	32	54.9	4.55	
Minden	74	22	50.1	3.20	
Monroe†	74	25	51.5	3.29	
Montgomery	.....	.....	.....	3.31	
New Iberia	75	34	55.6	5.70	
Opelousas	78	29[g]	55.9[d]	6.75	
Palncourtville †	78	31	56.6	6.51	
Plain Dealing †	74	22	50.4	2.73	
Plaquemine	80	31	56.0	4.98	
Rayne	79	31	56.4	7.78	
Robeline	77	20	51.2	3.27	
Ruston	75	21	52.0	3.17	
Schriever	82	28	56.0	6.82	
Shellbeach	73	36	57.0	8.78	
Southern University†	79	28	55.2	12.50	
Sugar Ex. Station†	74	29	54.4	8.86	
Sugartown†	77	31	55.4	5.11	
Venice†	78	34	56.4	7.02	
Wallace	75	32	55.4	6.66	
Whitehall [2]	80	31	59.4	4.50	
White Sulphur Springs.	82	24	56.2	5.12	
Maine.					
Bar Harbor	50	— 5	28.0	9.15	32.5
Belfast*[6]	40	— 8	26.6	11.35	28.0
Calais	43	—15	26.2	8.25	36.0
Cornish*[1]	55	— 9	26.3	3.85	15.2
Cumberland Mills	55	—16	27.4	6.52	16.0
Fairfield	45	—28	24.3	6.48	30.0
Farmington	48	—26	22.0	6.85	63.5
Flagstaff	.....	—36	.....	6.90	63.0
Gardiner	51	—23	25.6	5.45	17.2
Indian Stream	41	—31	18.0	7.99	75.0
Kineo†	39	—30	18.2	6.90	48.5
Lewiston	50	—18	25.8	7.07	25.5
North Bridgton	45	—21	22.8	7.26	36.0
Orono	47	—25	24.6	8.05	39.0
Petit Menan*[1]	37	12	28.6	.....	.....
Winslow	46	—26	24.2	4.91	26.0
Maryland.					
Annapolis	63	7	36.4	1.40	.....
Bachmans Valley	58	2	31.2	1.91	T.
Boettcherville	65	2	31.2	0.70	2.0
Charlotte Hall †	70	2	35.6	1.10	0.2
Cherryfields†[2]	.....	.....	34.4	1.45	T.
Chestertown	61	9	33.8	1.97	
Collegepark	68[c]	11[c]	36.2[c]	1.36	T.
Cumberland *b*	66	9	37.0	1.15	0.5
Darlington †	62	1	33.0	1.73	
Deerpark	61	— 6	26.8	3.21	22.0
Denton	67	7	35.4	2.03	T.
Easton†	63	10	34.3	1.60	T.
Ellicott City	65	1	32.6	1.37	T.
Fallston	61	3	33.0	1.59	T.
Flintstone	64	— 3	31.4	1.72	2.0
Frederick	63	5	34.0	1.49	T.
Grantsville	67	— 5	27.9	2.06	14.5
Greatfalls	64	3	32.8	1.12	.....
Greenspring Furnace	60	— 1	31.0	1.25	T.
Hagerstown †	62	3	33.4	1.10	.....
Jewell†	66	5	35.0	1.55	T.
Johns Hopkins Hospital	65	7	33.0	1.64	.....
Laurel	61	2	33.2	0.92	.....
McDonough	60	6	33.6	.....	.....
Mardela Springs†	67	9	37.3	2.03	T.
Mount St. Marys Coll. †	62	2	30.8	1.41	T.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Maryland—Cont'd.	°	°	°	*Ins.*	*Ins.*
New Market	.....	2	.....	1.97	0.9
Pocomoke City	70	12	40.4	1.50	.....
Port Deposit	64	2	33.4	2.10	1.0
Princess Anne	66	11	37.5	1.40	T.
Sharpsburg	60	3	31.2	1.24	T.
Smithsburg	68	1	31.5	1.49	T.
Solomons†	63	11	36.4	1.86	0.4
Sunnyside	64	— 9	26.6	2.65	13.0
Taneytown †	63	3	31.6	1.86	1.1
Van Bibber	62	4	32.6	2.20	T.
Westernport	66	— 1	30.2	0.76	2.5
Westminster	62	3	34.2	1.62	.....
Woodstock	61	2	32.1	1.31	T.
Massachusetts.					
Adams	50	—10	27.7	.....	.....
Amherst	50	—15	27.6	4.83	22.6
Attleboro	.....	.....	.....	6.18	.....
Bedford	57[f]	10[f]	33.7[f]	4.25	.....
Bluehill (summit)	53	— 1	29.8	5.28	14.0
Cambridge *a*	58	— 3	29.9	5.35	.....
Chestnut Hill	56	— 8	30.2	5.58	9.5
Clinton	55	— 9	27.9	.....	.....
Cohasset	.....	.....	.....	9.17	.....
Concord	56	—19	27.4	4.57	23.7
Dudley[1]	52*	— 4	28.4	3.55	14.0
East Templeton*[1]	51	— 4	26.6	1.96	19.0
Fallriver	50	3	32.7	6.12	7.0
Fiskdale	.....	.....	.....	3.80	.....
Fitchburg *a**[1]	52	— 2	27.5	4.14	15.5
Fitchburg *b*	54	— 3	28.0	4.01	10.0
Framingham	53	—14	29.3	4.27	.....
Groton	54	— 6	26.6	4.66	1" 0
Hadley	54	—22	24.9	.....	.....
Hyannis*†[1]	54	2	31.8	4.27	5.1
Jefferson	.....	.....	.....	3.33	9.5
Lawrence	57	—19	28.2	4.92	34.2
Leeds	50	—19	25.6	4.45	22.5
Leicester Hill	51	— 4	27.4	4.36	26.0
Leominster	.....	.....	.....	3.90	15.7
Long Plain	.....	.....	.....	7.08	.....
Lowell *a*	56	—16	28.0	7.05	.....
Lowell *b*	57	—16	27.7	.....	.....
Lowell *c*	62	— 5	29.0	.....	.....
Ludlow	49	—15	22.8	.....	.....
Lynn *a*	60	3	30.7	.....	.....
Mansfield*[1]	51	—20	28.2	5.73	14.0
Middleboro	54	— 9	30.0	4.96	4.0
Monson	54	—11	29.5	3.93	14.0
Mount Nonotuck	.....	.....	.....	5.30	22.5
New Bedford *a*	54	5	33.0	5.28	3.0
New Salem	53	— 7	26.6	4.23	17.7
Pittsfield	45	—10	25.0	3.74	26.5
Plymouth	.....	.....	.....	5.24	16.0
Princeton	.....	.....	.....	2.90	9.5
Provincetown	54	11	32.9	4.53	2.5
Salem	.....	.....	.....	5.50	13.0
Somerset*[1]	52	— 6	32.2	6.11	14.0
South Clinton	.....	.....	.....	4.04	4.8
Springfield Armory	55	—10	28.4	4.45	15.8
Sterling	.....	.....	.....	2.94	6.2
Taunton *b*	51	—10	29.2	6.43	14.5
Taunton *c*	55	—15	29.8	6.07	.....
Turners Falls	52	—21	25.5	1.86	.....
Webster	.....	.....	.....	4.08	19.0
Westboro†	57	—15	29.6	5.19	19.0
Weston	55	—12	29.1	4.74	17.7
Williamstown	45	— 8	24.8	2.15	30.0
Winchendon	.....	.....	.....	3.47	22.0
Worcester *b*	53	0	30.0	4.78	18.0
Michigan.					
Adrian	57	— 7	25.3	1.28	6.8
Agricultural College	50	—10	23.8	1.82	15.7
Allegan	52	1	26.2	2.55	28.0
Alma	46	—10	23.1	1.93	18.5
Ann Arbor	55	— 6	24.5	2.16	10.9
Arbela	52	— 8	24.6	2.34	18.0
Baldwin	47	—22	21.8	3.06	23.0
Ball Mountain	50	— 9	22.5	1.80	15.0
Battlecreek	56	— 6	25.3	3.25	24.7
Bay City *b*	47°	—12	25.8	.....	.....
Benton Harbor	57	— 2	28.0	2.76	14.0
Berlin	51	—13	22.1	2.35	14.9
Big Rapids	43	— 8	21.4	2.95	16.5
Birmingham	53	—10	24.7	2.28	11.0
Boon	47	—15	19.8	2.52	17.9
Calumet	40	—19	18.3	2.30	20.0
Camden	54	— 9	26.6	2.77	15.0
Carsonville	52	— 2	24.4	3.20	27.5
Charlevoix	44	— 5	20.4	3.02	25.2
Cheboygan	45	—14	20.0	2.01	15.7
Clinton	56	—12	26.0	1.68	8.0
Coldwater	55	— 7	26.3	2.59	.....
East Tawas	43	—10	22.4	.....	28.0
Eloise	57	— 5	25.6	2.33	11.4
Escanaba†	41	—10	20.0	1.82	18.5
Ewen	40	—13	14.8	1.42	13.5

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Michigan—Cont'd.	°	°	°	*Ins.*	*Ins.*
Fairview	53	— 9	24.4	1.89	10.2
Fitchburg	53	—10	23.7	3.48	23.5
Flint	53	—12	22.8	1.96	16.5
Gladwin	45	—14	21.4	1.85	17.0
Grand Rapids *b*	52	— 1	24.8	5.77	29.5
Grape	59	— 5	27.2	1.74	7.5
Grayling	43	—21	19.0	1.60	14.0
Hanover	54	— 8	25.5	2.84	15.5
Harrisville	42	—15	21.5	2.17	20.3
Hart	47	— 1	25.0	2.09	16.5
Hastings	51	— 5	23.6	3.57	30.5
Hayes	47	—12	21.6	1.82	.....
Hillsdale	53	— 7	25.2	2.41	10.5
Howell	54	—10	25.8	2.61	9.5
Humboldt	43	—30	13.8	2.15	20.5
Iron River	47	—19	15.4[6]	1.66	.....
Ivan	45	—12	22.0	2.61	22.0
Jackson	56	— 6	26.0	1.90	.....
Jeddo	52	— 9	23.0	2.84	24.8
Kalamazoo	58	— 8	25.1	2.50	18.2
Lake City	43	—13	20.2	0.70	7.0
Lansing	52	— 6	23.9	1.93	18.2
Lapeer	52	—15	22.4	2.31	23.5
Lathrop	44	—17	18.3	2.90	26.5
Ludington	47	2	24.6	0.93	6.8
Luzerne	44	—15	18.2	2.29	20.0
Mackinaw City	44	—14	18.8	2.30	15.0
Madison	56	— 7	26.0	1.90	9.6
Mancelona	43	— 6	20.4	1.87	18.0
Manistee	44	1	24.2	2.05	17.5
Manistique	39	—10	20.1	1.78	15.0
Middle Island [10]	44	— 1	25.0	.....	.....
Midland	45	—12	20.8	.....	.....
Mottville	58	—11	26.4	2.34	8.7
Mount Clemens	58	— 8	24.6	1.72	13.0
Mount Pleasant *b*	43	—11	19.6	2.33	22.0
Muskegon	45	— 4	23.9	1.66	11.0
Newberry	43	—11	15.8	1.25	9.5
North Marshall	52	—16	22.5	.....	.....
Northport	47	— 7	22.9	2.18	22.5
Ol.l Mission	47	— 2	23.8	2.09	13.8
Olivet	53	— 7	25.8	3.80	27.2
Ovid	50	— 9	23.4	2.29	20.0
Owosso	50	— 9	23.6	2.31	16.5
Parkville	.....	.....	.....	2.88	14.0
Petoskey	46	—12	21.2	2.98	25.0
Plymouth	55	—10	24.1	1.66	9.0
Port Austin	49	—12	23.4	1.52	14.0
Reed City	48	—11	20.3	1.61	6.0
Rockland	54	—15	17.2	2.39	23.9
Rogers City	49	—13	21.1	.....	.....
Romeo	44	— 9	25.1	.....	.....
Saginaw	49	—11	22.4	3.49	24.2
St. Ignace	37	—16	17.6	1.85	10.0
St. Johns	50	— 8	24.2	1.65	9.0
Sandbeach *a*	42	—11	20.8	1.40	14.0
Sidnaw	48	—21	17.0	2.40	8.5
Somerset	53	— 7	24.6	2.85	16.0
Stanton	44	— 8	21.8	.....	.....
Thomaston	40	—10	16.6	2.52	21.0
Thornville	52	— 6	24.4	2.68	25.0
Traverse City	48	— 3	23.0	2.55	24.0
Valley Center	50	—14	21.1	2.35	17.1
Vandalia	57	— 9	26.4	4.06	24.8
Vassar	50	—13	23.9	2.74	25.3
Vermillion Point [10]	40	—12	16.6	.....	.....
Wasepi	55	— 8	26.3	2.45	10.0
Waverly	50	— 5	24.2	2.72	26.3
West Harrisville	47	—15	20.2	2.13	19.8
Wetmore	43	—14	18.6	2.50	25.0
White Cloud	42	—10	20.1	3.12	22.4
Ypsilanti	59	— 7	25.6	2.75	14.0
Minnesota.					
Ada†	51	—26	12.7	0.29	4.0
Albert Lea	41	—15	18.6	1.97	12.8
Alexandria†	50	—19	13.8	0.91	8.5
Beardsley	52	—21	16.5	0.75	7.5
Bingham Lake	46	—15	17.8	1.17	11.7
Bird Island	47	—15	18.2	0.92	9.2
Blooming Prairie†	42	—15	19.4	1.70	12.0
Caledonia†	41	—13	20.1	2.22	19.0
Camden	52	—16	18.6	0.78	9.0
Collegeville	45	—16	19.0	0.67	5.2
Crookston†	48	—25	12.2	0.52	7.3
Detroit City	49	—27	10.8	1.30	13.0
Faribault	46	—15	19.4	1.90	13.6
Farmington†	45	—18	18.6	1.69	10.0
Fergus Falls†	46	—20	15.6	0.84	8.4
Glencoe	49	—15	18.4	1.10	.....
Glenwood	47	—18	15.5	1.15	12.0
Grand Meadow†	43	—15	16.6	1.74	13.0
Koochicking	47	—33	7.8	0.46	.....
Lake City	40	—12	20.8	.....	.....
Lake Jennie	42	—15	15.8	1.15	9.5
Lakeside†	46	—15	16.4	1.03	6.2
Lake Winnibigoshish	45	—27	9.8	0.55	5.3
Minnesota—Cont'd.	°	°	°	*Ins.*	*Ins.*
Lambert†	48	—31	11.8	1.00	10.0
Leech Lake	50	—33	10.8	0.67	6.4
Long Prairie	44	—24	14.0	1.05	11.5
Lutsen	37	—20	16.2	0.64	.....
Luverne†	45	— 9	19.8	0.40	4.0
Lynd	48	—15	16.4	0.48	4.8
Mapleplain	.....	.....	.....	1.78	11.5
Maplewood *[1]	43	—14	20.8	.....	.....
Milaca	47	—20	13.8	0.40	4.0
Milan†	49	—22	15.2	1.45	10.2
Minneapolis *a*	44	—15	19.2	1.79	9.9
Minneapolis *b*[1]	43*	—17	19.2	1.43	7.0
Minnesota City *†[1]	42	—12	21.9	0.91	7.5
Montevideo†	55	—16	18.2	1.00	10.0
Morris	49	—18	16.4	0.70	7.0
Mount Iron	60	—25	14.7	0.60	6.0
Newfolden	45	—32	7.8	.....	.....
New London	46	—18	15.0	0.70	7.0
New Richland *[1]	43	—19	19.4	.....	.....
New Ulm†	48	—13	19.6	1.58	9.5
Park Rapids†	43	—31	11.6	0.70	7.0
Pine River	44	—27	13.8	0.99	7.9
Pleasant Mounds	50	—14	19.8	1.46	7.0
Pokegama Falls	44	—37	8.9	0.57	5.3
Rolling Green	45	—12	18.8	0.40	4.0
Roseau	45	—29	8.0	0.72	7.7
St. Charles†	41	—22	19.6	1.20	8.5
St. Cloud	44	—17	15.8	1.78	16.0
St. Olaf	45	—17	15.6	0.66	12.8
St. Peter	44	—12	16.8	0.30	3.0
Sandy Lake Dam	40	—25	13.0	0.64	4.8
Sauk Center	43	—22	13.7	.....	.....
Spring Park	.....	.....	.....	1.07	10.7
Tower†	40	—42	5.6	1.10	11.0
Two Harbors	59	—14	20.0	0.79	7.0
Wabasha *[1]	43	—14	21.3	1.36	10.0
Willmar†	47	—19	16.0	0.75	6.5
Worthington	45	—24	19.1	0.30	2.5
Zumbrota [1]	42*	—17	20.9	.....	.....
Mississippi.					
Agricultural College	71	18	45.4	1.73	
Austin†	75	18	46.4	2.00	T.
Batesville†	68	20	46.2	1.77	
Bay St. Louis	75	31	53.0	8.00	
Biloxi†	76	29	53.0	5.03	
Booneville	71	14	43.8	1.97	
Briers	72	29	51.8	3.47	
Brookhaven†	77	23	51.9	5.62	
Canton†	74	24	51.4	2.03	
Columbus *a*	.....	.....	.....	1.91	
Crystal Springs†	77	24	51.5	4.53	
Edwards	73	25	52.5	3.20	
Fayette	.....	.....	.....	2.75	
French Camps	75	16	46.3	1.46	T.
Greenville *a*	67	23	47.6	3.05	
Greenville *b*†	73	21	48.7	2.89	
Greenwood	72	23	47.8	1.64	
Hattiesburg†	77	26	52.2	2.65	
Holly Springs†	69	16	42.1	2.13	
Jackson†	75	25	48.7	2.73	
Kosciusko	70	20	48.0	1.63	
Lake†	70	22	44.8	.....	
Logtown†	75	31	55.4	7.06	
Louisville†	72	17	47.5	1.08	T.
Macon†	74	23	47.8	1.63	
Magnolia†	75	24	53.0	7.21	
Meridian†	72	22	49.9	3.71	
Natchez†	78	28	54.0	4.50	
Okolona†	73	19	44.1	0.99	
Palo Alto	73	19	46.8	2.59	
Pontotoc	72	15	45.0	1.09	T.
Port Gibson†	79	24	51.7	2.38	
Ripley	72	14	43.5	1.97	
Rosedale	77	20	47.4	1.69	
Stonington *[1]	72	28	52.1	.....	
Thornton	70	30	53.8	2.50	
Tupelo†	.....	.....	.....	0.91	
University [7]	72	15	47.0	.....	
Walnut Grove	77[4]	25[4]	49.8[4]	2.09	
Water Valley *†[1]	70	17	46.2	1.72	T.
Woodville†	74	29	54.2	5.49	
Yazoo City†	78	21	49.1	2.12	
Missouri.					
Arthur *[3]	.....	12	36.2	0.60	
Avalon	60	— 7	30.4	1.31	1.2
Bethany	54	— 9	29.6	1.23	3.5
Birchtree	68	3	36.0	1.97	
Boonville†	.....	.....	.....	2.10	
Brunswick	..	.....	.....	1.96	
Carrollton†	64	2	34.8	1.53	
Conception	54	— 3	37.1	1.24	3.0
Cowgill *[5]	58	— 6	32.2	0.55	2.0
Darksville†	62[4]	15[4]	34.2[4]	2.10	
Downing	....	.....	.....	1.73	5.0
East Lynne *[3]	.....	11	35.4	2.33	T.
Edgehill *[5]	64	6	36.0	1.28	T.
Missouri—Cont'd.	°	°	°	*Ins.*	*Ins.*
Eightmile *[1]	63	8	36.2	2.04	T.
Eldon	67	3	37.0	2.04	T.
Elmira	60	— 6	32.0	1.14	1.5
Fairport	.....	.....	.....	1.30	1.5
Farmersville	.....	.....	.....	1.10	3.5
Fayette	68	3	36.6	1.95	T.
Fulton	.....	.....	.....	1.86	T.
Gallatin *[1]	54	— 2	31.9	1.39	4.0
Glasgow	66	1	34.2	1.94	T.
Gordonville *[3]	.....	9	35.8	1.78	T.
Gorin	.....	.....	.....	1.48	4.0
Halfway	.....	9	.....	0.47	T.
Harrisonville†	65	5	34.2	2.42	T.
Hermann†	.....	.....	.....	1.36	0.1
Houston	67	7	40.2	1.86	
Houstonia	.....	.....	.....	2.17	0.5
Humansville	68	8	38.6	1.71	T.
Irena	.....	.....	.....	1.57	1.8
Ironton†	69	2	36.6	2.20	0.2
Jefferson City†	67	6	37.4	1.70	T.
Kidder	58	— 6	30.8	1.50	2.7
Lamar†	69	9	39.4	1.06	T.
Lamonte	.....	.....	.....	2.50	T.
Lebanon	65	5	38.2	1.03	0.5
Lexington	63	1	35.1	1.80	
Liberty	65	2	34.8	0.80	T.
Louisiana	70	1	35.8	1.82	0.5
McCune *†[1]	65	1	34.4	1.98	1.5
Malden	70	10	43.6	2.23	T.
Mansfield	.....	.....	.....	2.30	
Marblehill	69	4	37.9	2.01	0.2
Marshall†	65	2	33.6	1.85	T.
Maryville	54	— 4	27.6	2.15	2.0
Mexico†	64	2	34.6	1.83	0.2
Mineralspring	68	6	39.0	0.71	T.
Montreal	64	1	37.2	0.81	0.2
Mount Vernon	70	11	41.0	0.33	0.5
Neosho	68	6	41.2	0.47	T.
Nevada	66	10	37.6	0.21	T.
New Haven *[1]	68	10	38.9	1.25	0.1
New Madrid	67	13	43.4	1.35	
New Palestine	71	5	40.3	3.53	T.
Oakfield	70	4	37.4	1.44	0.8
Oakmound	.....	.....	.....	2.92	
Olden†	68	4	38.5	3.21	T.
Oregon *a*	61	1	32.6	2.34	3.2
Oregon *b*	64	1	33.8	2.09	2.1
Osceola†	.....	.....	.....	1.00	
Oto	.....	.....	.....	0.30	T.
Palmyra *[5]	62	0	32.2	2.07	2.5
Phillipsburg *†[1]	64	5	36.3	1.16	0.2
Pickering *[3]	.....	— 8	30.5	1.82	2.0
Platte River *[3]	.....	— 6	29.2	1.24	1.5
Poplar Bluff	70[4]	7[4]	39.8[4]	3.13	T.
Potosi	67	0	31.3	1.25	0.2
Princeton	56	— 6	28.4	1.24	3.0
Rhineland	68	6	37.2	1.91	0.2
Richmond	60	0	33.0	1.45	
Rolla	.....	.....	.....	1.70	1.0
St. Charles	70	4	35.6	1.66	1.5
St. Joseph	.....	.....	.....	2.05	1.0
Sarcoxie *[3]	.....	8	33.8	0.38	0.1
Sedalia	63	0	33.3	3.00	
Seymour	62	7	37.2	2.45	T.
Shelbina	.....	.....	.....	2.00	
Sikeston	69	8	37.8	1.34	T.
Steffenville	61	1	33.2	1.17	3.0
Stellada†	62	6	34.9	2.59	
Sublett	60	— 8	27.6	1.60	4.0
Trenton	56	— 3	30.8	0.90	3.0
Vichy	64	— 1	36.9	1.57	T.
Virgil City	.....	.....	.....	0.66	T.
Warrenton	68	1	33.4	1.85	0.5
Wheatland	.....	.....	.....	0.75	T.
Willow Springs	67	3	36.0	2.59	T.
Zeltonia	71	4	39.0	1.94	T.
Montana.					
Augusta [9]	60	— 8	34.8	0.07	0.5
Bigtimber	57	3	35.0	T.	T.
Billings	59	— 5	32.7	0.30	3.0
Boulder	57	— 3	30.5	.....	.....
Bozeman†	52	2	31.3	0.49	4.9
Butte	49	9	30.2	0.55	2.5
Castle	46	2	28.2	0.11	1.1
Chinook†	56	—15	21.0	0.63	6.3
Choteau	.....	.....	.....	0.50	5.0
Columbia Falls	47	8	31.3	1.97	4.0
Deer Lodge	61	4	31.4	0.52	1.0
Dupuyer	58	—15	29.2	0.60	6.0
Fort Benton	62	—10	31.8	T.	T.
Fort Keogh†	52	—14	25.6	0.17	1.6
Fort Logan	57	—10	30.0	0.00	
Fort Missoula	57	5	33.3	1.21	2.2
Glasgow	54	—18	16.0	0.65	....
Glendive†	56	—15	25.0	0.30	3.0
Glenwood	51	3	31.0	0.19	1.9

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Montana—Cont'd.	°	°	°	*Ins.*	*Ins.*
Greatfalls†	63	— 8	35.8	0.20	2.0
Hogan	52	—15	32.4	0.35	2.0
Kipp†	53	—21	25.6	0.59	3.8
Lewistown	55	—10	30.1	0.80	7.5
Livingston†	56	10	34.5	0.23	2.2
Manhattan †	54	3	31.2	0.11	1.0
Martinsdale†	55	2	31.4	0.18	1.0
Marysville†	50	5	30.8	0.47	3.3
Monarch	56	—15	32.0	0.60	7.5
Parrot	55	7	34.7	0.04	0.4
Poplar	52	—21	17.2	0.60	6.0
Redlodge	52	— 2	28.0	1.52	15.0
St. Ignatius Mission	55	8	35.6	0.86	.....
St. Pauls†	55	—11	30.6	0.01	0.3
Troy†	54	10	33.2	.....	.....
Utica	54	— 9	29.8	0.27	1.5
Virginia City†	50	7	30.2	0.33	2.0
Wibaux	54	—19	23.8	T.	T.
Yale	55	— 5	30.1	0.37	3.8
Nebraska.					
Agee*1	57	— 6	26.9	0.63	4.0
Albion	53	— 5	28.1	0.67	8.2
Alliance*1	57	1	26.2	T.	T.
Alma*1	64	2	30.7	0.20	2.0
Ansley†	60	— 3	30.5	0.45	4.5
Arapaho*1	60	6	32.5	T.	T.
Arborville*1	57	0	30.7	0.31	3.0
Ashland *a*†	54	— 2	29.6	0.83	6.0
Ashland *b*1	56	2	31.1	0.75	.....
Ashton	57	— 4	29.8	0.40	4.0
Auburn*†1	60	0	29.0	2.11	3.0
Aurora*1	56	2	31.0	0.70	7.0
Beatrice†	57	0	29.4	1.92	3.0
Beaver City†	68	5	36.2	0.02	T.
Benedict	.....	.....	.....	0.55	.....
Benkelman	.....	.....	.....	T.	T.
Blair	50	— 4	26.1	0.65	1.0
Bluehill	.....	.....	.....	0.27	3.0
Brokenbow*1	50	0	30.8	0.10	1.0
Burchard	.....	.....	.....	0.95	2.0
Burwell	.....	.....	.....	0.30	3.0
Callaway†	62	2	31.0	0.15	1.0
Camp Clarke	.....	— 7	.....	T.	T.
Central City*5	56	— 2	31.6	0.30	3.0
Chester*1	56	4	31.8	0.95	0.5
Cody	.....	.....	.....	0.02	0.5
Columbus†	54	— 3	29.4	0.48	4.2
Cornlea	.....	.....	.....	0.66	6.1
Creighton†	49	— 6	24.5	1.50	6.0
Crete	58	— 5	32.9	1.23	1.3
Culbertson	.....	.....	.....	0.00	.....
Curtis*a*	69	6	37.8	0.20	2.0
Dannebrog*1	60	0	33.7	0.71	5.5
David City	53	— 3	28.2	0.50	5.0
Dawson	62	2	33.2	2.16	3.0
Divide	.....	.....	.....	0.45	4.5
Dunning*1	61	12	34.0	0.25	2.5
Eden	.....	.....	.....	2.85	3.0
Edgar*1	56	2	31.2	0.36	4.0
Elba	.....	.....	.....	0.55	5.5
Ericson*†1	55	— 8	26.0	0.40	4.0
Ewing†	.....	.....	.....	0.20	2.0
Fairbury†	61	4	32.9	1.09	1.5
Fairfield	55	1	32.0	0.21	2.0
Fairmont†	60	1	28.2	0.60	1.0
Fort Robinson	61	— 4	30.5	0.20	2.0
Franklin	68	5	34.6	0.30	3.0
Fremont†	53	— 5	28.4	0.67	3.5
Geneva†	58	2	31.4	0.87	4.0
Genoa	53	— 3	28.9	0.94	9.2
Gordon	.....	.....	.....	0.10	1.0
Gothenburg	64	2	32.6	0.40	4.0
Grand Island *a*1	66	1	33.7	0.65	6.5
Grand Island *b*	58	0	31.4	0.73	7.5
Greeley*1	50	— 8	27.6	0.50	5.0
Haigler	.....	.....	.....	T.	T.
Hartington†	47	— 7	22.6	0.83	8.0
Harvard	58	1	31.3	1.00	2.5
Hastings*1	57	1	31.5	0.33	4.5
Hayes Center	.....	.....	.....	0.25	2.5
Hay Springs	60	— 9	30.3	0.55	5.0
Hebron†	60	3	32.4	0.71	2.0
Hickman	.....	.....	.....	1.73	1.2
Holdrege*b*1	64	12	35.6	0.25	2.5
Hooper*1	50	— 4	26.6	0.87	2.1
Imperial†	68	3	34.6	0.22	2.2
Indianola (near)*1	66	4	34.9	0.00	
Johnstown	.....	.....	.....	T.	T.
Kearney*5	60	12	28.8	0.25	.....
Kennedy	58	— 8	31.7	T.	T.
Kimball†	62	0	34.4	0.15	1.5
Kirkwood*1	56	— 6	28.6	0.74	6.5
Lexington†	65	0	31.8	0.30	.....
Lincoln *b*	58	0	30.4	0.62	1.5
Lincoln *d*†	58	— 9	31.9	0.92	0.8
Lodgepole†	62	— 1	33.7	0.10	1.0
Loup *b*1	62	0	31.4	0.08	1.0
Lynch*†1	59	— 5	25.7	0.60	4.7
Lyons	.....	.....	.....	0.60	5.0
McCook*1	60	6	34.0	T.	T.
McCool	.....	.....	.....	0.50	.....
Madison	52	— 4	27.2	0.70	6.5
Madrid*5	65	0	34.6	0.20	2.0
Marquette	.....	.....	.....	0.50	5.0
Merriman	.....	.....	.....	T.	0.0
Minden *a*	63	2	32.4	0.44	4.9
Minden *b*	.....	.....	.....	0.50	.....
Monroe	.....	.....	.....	0.30	.....
Nebraska City *b*	.....	.....	.....	1.05	4.0
Nebraska City *c*	58	0	28.9	0.71	.....
Nemaha*1	57	— 2	30.4	3.30	4.0
Nesbit	57	— 8	30.7	0.15	1.0
Norfolk *b*	49	— 4	25.4	0.70	5.0
North Loup	58	— 3	30.2	0.40	4.0
Oakdale†	50	— 5	26.0	0.78	7.3
Odell*5	56	0	30.8	2.32	1.5
O'Neill†	58	— 7	26.1	0.42	3.5
Ord	54	— 5	29.2	0.34	.....
Osceola	.....	.....	.....	0.35	3.5
Ough†	.....	.....	.....	T.	T.
Palmer *b*	.....	.....	.....	0.50	5.0
Plattsmouth*1	52	0	28.5	0.22	2.2
Ravenna *a*	60	1	32.2	0.68	6.8
Redcloud *a*	.....	.....	.....	0.10	1.5
Redcloud *b*1	60	7	35.2	0.15	1.5
Republican*1	60	4	33.1	0.25	2.5
Rulo*1	52	4	33.2	1.50	0.0
St. Libory	58	0	32.0	0.80	8.0
St. Paul	56	0	32.7	0.56	5.5
Salem*1	54	2	32.2	2.25	T.
Santee Agency†	53	— 6	26.6	0.99	10.5
Sargent	.....	.....	.....	0.43	.....
Schuyler	.....	.....	.....	0.15	1.5
Seneca*1	56	2	32.6	0.00	
Seward*1	52	0	29.8	0.20	2.0
Springview	56	— 9	28.7	0.12	1.2
Stanton*1	50*	— 6*	25.1*	0.45	4.5
Stockham	.....	.....	.....	0.60	4.0
Strang*1	55	2	32.2	0.40	3.0
Stratton	.....	.....	.....	0.00	
Superior*5	52	4	31.0	0.80	3.0
Sutton	57	0	29.6	1.16	5.3
Syracuse	.....	.....	.....	0.92	.....
Tablerock	.....	.....	.....	2.11	.....
Tecumseh *b*†	52	— 4	29.5	0.87	1.5
Tekamah	50	— 4	27.2	0.12	1.0
Thedford*1	56	— 2	28.3	0.60	4.0
Turlington†	48	— 7	24.2	1.23	2.5
Valentine†	60	— 6	31.1	0.28	.....
Valparaiso	.....	.....	.....	0.25	1.0
Wakefield	43	— 8	23.4	0.58	5.8
Wallace	.....	.....	.....	0.10	1.0
Weeping Water*1	51	2	27.0	1.07	3.0
Westpoint†	50	0	27.4	0.70	6.2
Whitman	.....	.....	.....	0.15	1.5
Wilber*1	60	4	35.4	1.04	2.0
Willard	.....	.....	.....	T.	T.
Wilsonville*1	64	6	34.6	0.15	1.5
Wisner	.....	.....	.....	0.20	2.0
Wymore*1	57	3	32.6	1.45	2.0
York*1	60	0	30.6	0.70	7.0
Nevada.					
Austin	53	15	35.0	0.27	2.5
Battle Mountain*1	60	10	36.2	0.06	0.0
Beowawe*1	63	10	36.8	T.	
Blaine	59	5	32.0	0.20	1.0
Bunkerville	.....	.....	.....	0.02	.....
Candelaria	71	20	43.6	0.06	
Carlin*1	72	12	34.3	0.00	
Carson City	66	19	40.3	0.95	4.6
Cranes Ranch	.....	.....	.....	0.34	.....
Elko*5	55	10	33.5	0.10	.....
Elko (near)	54	4	31.4	0.04	0.5
Ely	54	0	32.3	0.20	2.0
Empire Ranch	54	5	33.2	0.12	2.2
Fenelon*1	56	0	30.0	0.20	2.5
Golconda*1	60	18	38.4	0.00	
Halleck*1	57	2	29.0	T.	T.
Hawthorne *a*5	67	28	42.7	0.00	
Hawthorne *b*	66	20	42.6	0.06	
Hot Springs*1	62	20	42.6	T.	
Humboldt*1	62	10	38.7	0.00	
Keysers Springs*1	65	4	31.3	0.10	T.
Lewers Ranch	65	15	40.2	1.75	12.0
Los Vegas	65	21	45.6	0.08	
Lovelock	.....	.....	.....	T.	
McGill	54	— 2	37.6	0.37	
Martins	64	20	40.6	0.54	2.0
Midas	66	16	36.6	0.30	2.8
Mill City*1	58	20	37.4	0.00	
Monitor Mill	52	— 1	30.6	0.43	3.5
Osceola	60	12	36.2	0.06	3.2
Nevada—Cont'd.					
Palisade*1	56	13	38.6	0.30	
Palmetto	65	9	37.4	T.	T.
Panaca	69	9	38.4	0.25	
Reno*5	70	20	41.0	.....	.....
Reno State University	66	20	39.0	1.47	1.2
Ruby Valley	.....	.....	.....	0.27	2.8
St. Clair	65	10	37.6	0.05	
St. Thomas	79	24	48.8	T.	
San Antonio	62	15	39.2	T.	T.
Silverpeak	69	9	39.8	T.	
Sodaville	69	20	43.3	0.20	
Tecoma*1	56	0	30.0	0.18	2.0
Toano*1	54	— 2	29.6	0.47	5.0
Tuscarora	47	2	29.2	0.73	3.0
Tybo	54	15	35.2	0.15	2.0
Verdi*1	76	15	43.4	0.91	10.0
Wadsworth*1	60	14	35.9	0.05	
Wells	49	0	29.4	0.72	.....
New Hampshire.					
Alstead	48	—12	24.5	4.76	32.9
Berlin Mills	50	—30	21.5	8.16	79.0
Bethlehem	45	—13	24.6	5.36	44.5
Brookline*1	54	—24	27.6	3.57	28.0
Claremont	48	—18	24.4	4.20	21.0
Concord	52	—32	24.8	4.26	22.0
Durham	54	—18	26.8	3.03	17.0
Grafton†	50	—33	22.8	3.97	42.5
Hanover	46	—22	24.3	3.99	31.8
Keene	55	—28	25.0	3.22	24.0
Lancaster	50	—31	22.7	3.56	34.0
Littleton	49	—13	26.2	3.02	27.2
Nashua	53	—20	25.9	4.57	22.2
Newton	54	—12	27.4	3.61	7.0
North Conway	52	—27	24.2	6.33	36.0
Peterboro	51	—21	24.0	4.09	28.8
Plymouth	47	—38	22.4	3.56	28.3
Sanbornton†	47	—15	23.1	3.04	27.5
Stratford	42	—25	22.8	2.28	22.3
Warner	.....	.....	.....	4.76	32.2
West Milan	42	—30	19.8	4.82	48.2
New Jersey.					
Asbury Park	61	0	33.8	4.43	3.5
Bayonne	62	5	33.4	4.59	4.2
Belvidere	55	— 4	30.0	3.07	.....
Beverly†	62	— 1	34.5	3.08	0.2
Billingsport*1	58	7	33.2	3.43	.....
Boonton	57	1	31.2	4.08	1.0
Bridgeton	62	11	36.2	3.81	1.9
Camden	60	4	33.8	3.45	0.7
Cape May C. H.†	64	10	35.2	1.80	0.5
Charlotteburg	55	— 6	29.2	3.99	.....
Chester	55	— 5	29.8	2.54	4.0
Clayton	63	4	34.8	3.37	0.3
College Farm†	60	— 5	32.8	3.49	1.7
Deckertown	57	— 3	29.6	3.42	7.5
Dover	58	— 4	29.5	3.11	2.0
Egg Harbor City	60	1	33.5	2.54	1.5
Elizabeth†	62	— 2	31.8	3.55	.....
Englewood	59	—11	29.8	4.59	.....
Franklin Furnace	65	— 5	30.0	3.50	6.0
Freehold	59	2	33.4	5.08	3.5
Friesburg	62	4	34.5	3.27	T.
Gillette	58	— 5	30.2	3.48	2.0
Hammonton	.....	.....	.....	2.74	.....
Hanover	55	— 6	30.6	3.51	1.5
Hightstown	59	0	33.6	3.12	2.5
Imlaystown	59	3	33.6	2.98	1.4
Junction	.....	.....	.....	3.31	4.0
Lambertville	59	0	32.9	3.05	2.0
Moorestown	63	1	35.0	3.46	T.
Newark *b*†	61	4	32.7	4.33	0.5
New Brunswick *a*	62	— 1	33.9	3.72	2.5
Newton	56	— 1	29.4	3.24	T.
Ocean City	54	8	34.4	.....	.....
Oceanic	58	1	33.6	5.44	2.0
Paterson	65	4	34.1	5.45	4.5
Perth Amboy	58	0	32.1	4.01	1.0
Plainfield	59	— 3	31.2	3.88	2.3
Port Norris	59	9	36.2	2.35	.....
Rancocas	.....	.....	.....	2.94	0.7
Rivervale	52	—15	29.0	3.32	.....
Roseland	57	— 3	30.7	4.36	2.5
Sergeantsville	59	— 2	31.2	3.23	T.
Somerville	60	— 4	33.0	3.16	2.0
South Orange	58	1	31.4	3.86	1.5
Staffordville	.....	.....	.....	3.90	2.0
Toms River	60	— 6	33.6	4.88	3.0
Trenton	60	2	36.0	3.10	T.
Vineland	62	5	35.1	2.21	1.2
Woodbine	64	3	35.6	2.55	.....
New Mexico.					
Albert	72	16	44.0	0.00	
Albuquerque†	65	21	41.3	0.54	.....
Aztec†	63	9	34.6	0.14	1.2
Bernalillo†	71	21	43.9	0.48	T.
Bluewater	60	4	33.8	0.10	1.0

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
New Mexico—Cont'd.	°	°	°	*Ins.*	*Ins.*
Buckmans	47	— 8	23.4	0.42	4.5
Clayton	79	10	43.4	0.05	0.5
Deming *9	72	34	50.6	T.	
East Lasvegas †	63	13	38.8	0.21	3.5
Eddy	79	12	48.2	0.20	
Engle †	67	20	44.8	0.00	
Espanola	65	10	36.2	0.00	
Folsom	64	12	35.9	0.14	0.5
Fort Bayard	72	21	44.6	0.00	
Fort Union	73	11	40.2	0.60	2.0
Fort Wingate	69	12	37.8	0.30	
Gallisteo †	74	17	37.5	0.50	5.0
Gallinas Spring †	68	11	41.5	0.12	1.0
Gila	74	26	47.4	0.08	
Hillsboro	84	24	50.2	0.13	
Laluz	72	22	48.7	0.17	
Las Cruces †	78	16	46.6	0.02	
Lordsburg *2	86	30	50.2	0.00	
Los Lunas	68	15	39.2	0.85	
Lower Penasco 4	74	20	44.5	0.25	
Puerto de Luna	73	19	44.2	0.00	
Raton	65	12	37.4	T.	
Rincon †	82	20	49.8	0.00	
Roswell †	79	14	45.1	0.86	
Shattucks Ranch	67	0	37.5	0.88	7.0
Socorro	68	18	42.9	0.44	
White Oaks †	65	18	40.4	0.41	1.5
Winsors Ranch	52	— 4	28.2	0.90	12.0
New York.					
Adams				1.23	
Addison	54	—7	28.3	1.80	8.2
Akron				2.36	
Alden	61	— 2	27.3	1.84	12.5
Alfred	54	—11	24.8	1.46	8.5
Angelica †	56	—10	26.4	1.41	8.0
Appleton	58	0	27.0	1.77	14.6
Arcade	57	— 4	25.8	1.66	13.6
Arkwright	52	0	27.2		
Atlanta				2.09	
Auburn	56	— 1	28.4	2.71	21.0
Avon	61	— 6	28.5	1.51	
Baldwinsville	53	— 4	26.5	1.51	10.0
Bedford	57	—10	30.1	3.69	2.7
Binghamton †	53	— 3	27.6	2.71	10.7
Bolivar	65	—14	25.2	1.76	10.0
Bouckville	44	—18	23.1	3.60	23.0
Boyds Corners				5.21	
Brentwood	56	—13	30.6	4.30	2.0
Brooklyn	57	5	33.2		
Canajoharie	47	— 8	26.4	2.22	15.0
Canton	59	—31	23.4	3.13	18.0
Carmel	53	—11	28.4	4.64	7.5
Catskill	50	— 6	27.6	4.74	19.0
Cedarhill	49	— 9	26.6	3.28	15.5
Charlotte *10	58	0	27.9		
Cherry Creek				3.56	
Cooperstown †	48	— 7	24.7	2.93	18.0
Cortland	52	— 3	26.8	2.39	19.0
Dekalb Junction				1.85	
Dryden	55	— 1	25.4		
Eagle Mills				2.15	
Easton				2.98	
Elizabethtown	48	—40	24.0	5.10	51.0
Elmira	57	— 5	28.2	1.45	7.5
Fleming	57	0	28.7	1.11	5.0
Fort Niagara †	58	— 2	27.1	1.42	13.0
Franklinville	59	— 6	24.6	1.98	12.3
Fulton				1.03	
Garrattsville	47	—10	26.1	1.75	1.5
Glens Falls	41	—14	23.4	3.83	29.5
Gloversville	47	—12	23.8	3.33	30.3
Greenwich	44	—16	24.4	2.83	20.6
Haskinsville				1.41	
Honeymead Brook	50	—11	26.9	2.32	11.1
Humphrey †	60	— 5	26.2	2.47	22.0
Ithaca	54	— 2	28.0	1.59	11.8
Jamestown	57	— 5	27.6	4.54	28.5
Keene Valley	43	—17	21.9	2.80	27.0
Kings Station				5.53	
Lake George	46	—22	24.6	7.41	66.5
Lake Placid	46	—30	23.7	2.50	25.0
Liberty	47	— 6	25.4		
Little Falls	41	—18	22.4	2.25	12.5
Lockport	60	— 1	29.0	3.65	30.0
Lowville	45	—26	22.8	2.10	17.0
Lyndonville				0.70	
Lyons	55	3	29.2	1.63	14.0
Madison Barracks †	68	—30	26.4	2.08	20.0
Middletown	52	—10	26.6	5.09	12.5
Mohonk Lake	54	— 2	27.2	5.00	
Mount Morris				1.40	14.0
Napoli				2.71	
Newark Valley				2.04	
New Lisbon	48	—17	23.2	2.13	19.0
Niagara Falls				2.49	
North Hammond †	52	—30	23.7	2.75	26.3
New York—Cont'd.					
North Lake	49	—31	20.2	2.82	16.5
Number Four †	48	—23	23.0	3.12	17.7
Nunda	61	— 8	27.6	1.55	10.5
Ogdensburg	49	—17	22.0	1.86	8.2
Oneonta	54	— 8	27.6	3.66	
Oxford	48	—13	25.8	3.11	14.0
Palermo	47	—14	24.5	2.50	18.0
Penn Yan	57	— 3	28.1	1.40	11.3
Perry City	52	—10	25.8	1.68	14.4
Phœnix				1.60	
Pine City				1.22	
Plattsburg Barracks †	46	—11	22.0		
Port Jervis	52	— 7	27.6	4.33	7.0
Poughkeepsie	51	—11	27.0	3.22	8.0
Primrose	56	— 5	30.4	2.45	1.2
Ridgeway	60	— 1	27.2	1.66	11.6
Rome	40	—13	22.6	2.38	
Romulus	51	0	28.0	1.81	15.0
Rose				2.43	
St. Johnsville	44	—13	24.8	2.48	10.1
Saranac Lake	54	—26	22.6	2.48	22.5
Saratoga Springs	53	—25	24.9	5.10	40.5
Setauket †	51	7	32.1	4.82	4.0
Sherwood				1.53	
Skaneateles				2.10	
South Canisteo	56	— 6	27.4	2.09	15.3
Southeast Reservoir				4.18	
South Kortright †	52	— 9	25.6	2.38	
Straits Corners	54	— 6	25.2	1.98	13.0
Ticonderoga	46	—12[4]	26.9[4]	4.88	39.0
Victor	58	— 3	26.6	3.04	19.5
Wappingers Falls	51	—15	27.7	4.51	10.5
Warwick				2.81	
Watertown	58	—22	26.5	3.08	18.5
Watkins	55	— 9	28.6	2.02	15.5
Waverly †	57	—13	27.6	1.70	9.0
Wedgwood	54	— 9	27.1	1.88	14.0
Westfield	63	0	29.6	2.60	12.0
Westpoint †	50[4]	— 7	24.9	3.60	6.3
Willetspoint	60	6	31.6	4.02	
North Carolina.					
Abshers	73	4	37.6	0.80	T.
Asheville †	69	4	36.8	0.37	0.8
Beaufort †	71	15	46.3	1.30	
Biltmore †	69	7	37.0	0.57	0.1
Bryson City †				1.17	1.8
Chapelhill †	71	11	36.0	1.06	
Edenton	69	16	42.2	1.38	
Experimental Farm	70	13	41.0	0.54	
Fairbluff †				0.93	
Fayetteville †	77	13	42.4	1.02	
Flatrock	63	4	33.4	0.67	0.5
Greensboro †	69	12	37.8	0.76	
Greenville	66	11	42.4	0.59	
Henderson †	68	11	39.0	0.87	T.
Highlands	56	— 2	32.4	1.42	1.5
Horse Cove	60	3	36.1	1.50	0.7
Lenoir *† [1]	64	11	36.2	0.76	
Linville †	57	— 5	29.4	0.90	2.5
Littleton †	67	10	37.8	0.62	0.2
Louisburg †	68	11	39.4	0.77	
Lumberton †	72	16	41.8	1.12	
Lynn †	72	10	41.2	0.92	T.
Mana				0.54	T.
Marion	72	9	38.9	0.73	T.
Mocksville	74	12	41.6	0.49	T.
Moncure †	73	13	41.6	1.00	
Monroe †	74	10	41.6	0.84	T.
Morganton	74	9	39.8	0.67	
Mountairy	67	6	36.2	0.40	0.5
Mount Pleasant	71	10	39.8	1.18	T.
Murphy †				0.87	4.0
Newbern †	70	20	47.8	2.22	
Oakridge †	69	10	37.5	0.60	T.
Pantego				1.93	
Pittsboro †	66	7	38.2	0.62	
Rockingham †	74	10	42.0	1.12	T.
Roxboro †				1.05	
Salem †	70	8	37.8	0.79	T.
Salisbury †	71	12	41.0	0.93	
Saxon †	70	4	36.6	0.45	
Selma	72	14	41.6	0.50	
Settle	65	8	36.0	0.55	T.
Sloan †	71	14	44.8	1.22	
Soapstone Mount †	69	9	37.8	0.95	T.
Southern Pines *a* †	75	14	44.3	1.37	
Southern Pines *b*	73	11	43.6	1.30	
Southport †	67	14	45.4	2.42	
Springhope *† [1]	65	14	38.0	0.50	
Tarboro	74	9	40.6	0.90	T.
Wash Woods				1.54	
Waynesville †	66	2	36.2	0.50	T.
Weldon †	68	12	39.4	0.79	
North Dakota.					
Amenia	52	—25	14.2	0.35	3.5
Ashley †	53	—22	14.4	0.25	2.5
North Dakota—Cont'd.					
Bottineau	41	—26	5.3	0.70	7.0
Buxton	48	—23	10.6	0.29	2.9
Churchs Ferry	55	—27	10.4	0.64	6.4
Coal Harbor	54	—20	13.5	0.46	4.6
Devils Lake	58	—15	11.8	1.05	10.5
Dickinson	54	—17	19.5	0.20	2.0
Dunseith	43	—28	9.6	0.40	4.0
Ellendale	54	—20	19.8	0.17	2.0
Falconer	56	—23	15.6	0.50	5.0
Fargo †	52	—26	10.2	0.10	1.0
Forman †	55	—21	14.1	0.17	2.0
Fort Berthold	61	—20	14.0	0.40	4.0
Fort Yates †	61	—18	18.1	0.45	4.5
Fullerton	53	—19	15.8	0.40	4.0
Gallatin †	54	—34	11.6	0.50	5.0
Glenullin	53	—21	17.6	0.20	2.0
Goetz	50	—30	11.0	0.62	6.2
Grafton †	47	—32	8.8	0.60	6.0
Grand Rapids †	54	—20	15.5	0.34	3.4
Hamilton	41	—24	9.5	0.63	6.4
Jamestown †	65	—25	15.8	0.05	0.5
Kelso	52	—22	10.1	0.00	
Larimore †	55	—26	8.7	0.70	7.0
McKinney	46	—32	8.8	0.45	4.5
Mayville	53	—20	15.6	0.13	1.3
Medora †	53	—16	20.6		
Melville	53	—23	15.0	0.25	2.5
Milton †	45	—23	6.6	0.40	4.0
Minnewaukon	56	—26	11.2	0.24	2.4
Minot	52	—25	13.2	0.60	6.0
Minto †	49	—31	10.2	0.62	6.4
Napoleon †	54	—18	15.2	0.65	6.5
New England City	55	—17	18.5	0.90	9.0
Oakdale †	52	—19	18.8	1.00	10.0
Portal	45	—25	9.2	0.40	4.0
Power †	53	—29	11.0	0.20	2.0
St. John †	45	—18	11.2	0.60	6.0
Sheyenne	56	—28	11.8	0.80	8.0
Steele †	53	—25	15.8	0.30	3.0
Towner †	50	—32	12.0		
University	48	—27	11.4	0.86	8.6
Valley City †				0.30	3.0
Wahpeton †	52	—19	18.2	0.65	6.5
White Earth	48	—30	15.6	0.22	2.2
Whites Ranch	57	—30	24.5	0.33	3.3
Wildrice † [2]			11.0	0.68	6.8
Willow City	46	—32	12.1	0.30	3.0
Woodbridge †	40	—26	8.1	0.06	0.6
Ohio.					
Akron	64	— 6	28.2	2.76	12.5
Annapolis	67	—14	27.0	1.46	6.5
Ashland	62	— 6	26.4	3.03	12.5
Ashtabula	62	— 3	28.0	2.17	15.0
Atwater				2.14	8.2
Bangorville	62	—11	27.0	3.09	12.5
Basil				3.06	9.0
Bement				3.03	18.0
Benton Ridge	61	— 6	28.8	2.73	11.5
Bethany	64	— 3	34.0	1.71	2.5
Bigprairie	64	— 8	28.2	3.12	12.5
Binola				2.73	18.0
Bissells	61	— 9	26.4	2.84	15.2
Bloomingburg	68	— 9	31.4	1.85	2.0
Bowling Green	62	— 6	28.3	2.04	9.8
Bucyrus	62	—11	28.4	2.00	14.0
Cambridge	67	—14	28.6	2.77	5.0
Camp Dennison	64	— 2	34.3	1.94	1.4
Canal Dover	67	— 8	28.6	3.22	9.0
Canton †	66	— 5	28.5	2.43	7.7
Cardington	65	—10	28.2	2.42	7.0
Carrollton	67	— 8	29.4	2.43	2.0
Cedarville				2.96	6.0
Celina	69	— 7	31.0	1.87	2.0
Cherryfork	67	—10	32.7	2.64	5.0
Circleville	67	— 2	32.6	2.06	1.5
Clarksville	65	— 5	33.0	2.17	2.5
Cleveland *a*	64	— 5	29.6	3.07	14.1
Cleveland *b*	65	— 5	27.8	2.29	9.1
Clifton	63	— 9	30.4	2.10	5.1
Coalton	68	—12	33.4	2.56	6.0
Colebrook	61	— 9	28.2	2.16	7.5
Dayton *a*	67	— 5	33.0	2.12	4.0
Dayton *b* †				1.66	2.0
Defiance	63	— 7	28.7	2.21	6.5
Delaware	65	— 5	30.6	2.44	8.5
Demos	66	— 8	29.0	1.29	3.8
Dupont	60	— 7	28.8	1.40	7.0
Elyria	65	— 7	28.2	2.36	11.1
Fairport Harbor *10	65	— 2	29.5		
Fayetteville	62	— 7	32.0	2.81	7.3
Findlay	65	— 7	28.9	2.37	18.0
Frankfort	68	— 4	33.3	2.18	0.5
Garrettsville †	65	—13	26.8	2.55	12.8
Granville	64	—10	29.0	2.62	5.2
Gratiot	64	—13	28.7	3.66	14.9
Greenfield	65	— 1	33.7		

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Ohio—Cont'd.	°	°	°	*Ins.*	*Ins.*
Greenhill	66	−12	28.0	1.95	5.2
Greenville	61	− 6	30.1	1.69	3.0
Hackney	68	− 9	30.5	1.93	3.1
Hanging Rock	70	− 7	34.6	1.75	2.5
Hedges	61	− 7	29.2	2.29	10.0
Hillhouse	65	− 9	26.8	2.78	20.0
Hillsboro†	68	− 8	33.3	2.03	1.5
Hiram	65	−10	25.7	2.40	11.0
Hudson	64	−11	27.5	4.11	16.0
Jacksonboro	64	− 4	32.1	1.25	1.0
Kenton	65	0	30.3	3.16	10.3
Killbuck	65	− 9	28.0	2.14	12.8
Lancaster	65	− 7	31.2	2.92	4.5
Leipsic	61	− 9	28.5	2.18	5.2
Levering	62	−14	26.8	2.74	12.0
Logan	71	−10	32.8	3.11	2.5
Lordstown	66	−10	26.6	1.88	5.8
McArthur	67	−13	30.6	2.72	2.0
McConnelsville†	70	− 8	30.2	3.70	10.9
Mansfield†				4.09	16.7
Marietta *b*	67	0	33.8	2.39	2.5
Marion	64	− 9	30.0	3.31	10.2
Medina	63	− 8	27.5	2.44	11.0
Milfordton	63	−14	26.6	2.56	8.5
Milligan	69	−20	30.7	2.81	6.0
Millport	65	−17	26.2	2.42	4.0
Montpelier	57	− 7	26.4	1.95	8.0
Napoleon		− 5		2.24	7.0
Neapolis				1.28	3.5
New Alexandria	66	− 6	29.8	2.67	4.0
New Berlin	64	−10	27.4	2.16	5.5
New Bremen	64	− 7	30.5	0.85	3.1
New Holland	67	− 5	32.2	2.05	5.2
New Paris	61	− 7	30.5	1.21	3.0
New Waterford	63	− 7	28.1	3.30	12.0
North Lewisburg	64	− 8	29.2	2.72	4.2
North Royalton	63	− 9	27.6	2.26	12.0
Norwalk	64	− 7	28.8	2.85	12.5
Oberlin	65	− 7	28.7	2.25	
Ohio State University	65	− 5	30.3	1.79	1.4
Orangeville	61	− 8	26.8	2.25	11.0
Ottawa	62	− 5	31.0	2.34	8.5
Pataskala†	66	−11	29.3	2.62	7.2
Perry				2.62	11.5
Philo	66	− 6	30.4	2.62	9.6
Plattsburg	63	− 8	30.3	1.93	4.0
Pomeroy	69	− 2	32.8	1.05	5.5
Portsmouth *a*†				1.69	T.
Portsmouth *b*	70	0	36.2	1.65	0.5
Richwood	61	− 8	29.8	2.48	6.5
Ridgeville Corners	60	− 8	27.8	1.52	6.5
Ripley	63	− 3	34.2	2.63	1.8
Rittman	63	−10	26.4	2.49	5.0
Rockyridge	62	− 6	28.1	2.45	11.2
Rosewood	61	− 6	29.8	1.77	4.0
Shenandoah	63	−10	26.7	2.56	9.6
Sidney *b*	65	− 5	29.4	1.85	5.9
Sinking Spring†	64	− 4	33.5	2.07	3.0
Somerset†	66	− 5	32.6	2.81	15.3
Springboro				1.35	3.0
Spring Valley	62	− 6	31.0	1.98	3.0
Strongsville				3.07	7.8
Sylvania	57	− 7	26.5	2.13	10.0
Thurman	72	− 7	34.5	1.53	1.0
Tiffin†	62	− 4	29.5	2.46	12.8
Upper Sandusky	63	− 7	29.6	2.24	13.0
Urbana	61	− 5	30.0	2.01	3.5
Vanceburg	67	− 4	34.3	2.65	5.5
Vanwert	63	− 7	28.6	2.04	8.5
Vermilion	64	− 6	28.2	2.20	13.5
Vickery	63	− 5	29.0	1.82	11.1
Walnut				2.39	4.5
Warren	64	− 6	28.8	2.81	10.4
Warsaw	67	−13	28.7	2.35	7.0
Wauseon	61	− 8	28.2	2.75	13.8
Waverly	69	− 6	33.4	2.17	1.5
Waynesville	60	− 6	30.4	1.72	3.5
Wellington	65	− 7	28.6	2.92	9.0
Westerville	63	− 5	31.2	2.02	4.4
Willoughby				3.42	10.0
Wooster *b*†	64	− 9	27.4	2.27	10.8
Youngstown	64	− 6	29.4	1.67	5.1
Zanesville†				2.37	9.0
Oklahoma.					
Anadarko†	81	14	47.0	4.10	
Arapaho†	77	13	42.8	2.62	
Burnett†	79	13	45.0	1.33	
Clifton†	78	9	44.3	2.57	
Edmond				4.18	
Fort Reno†	78	11	45.4	6.34	
Fort Sill	79	16	49.1	2.20	
Hennessey		16		3.45	
Hopeton				0.85	T.
Jefferson	75	15	43.8	2.55	
Kingfisher	79	17	45.0	4.03	
Mangum†	82	15	44.5	3.38	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Oklahoma—Cont'd.	°	°	°	*Ins.*	*Ins.*
Newkirk	67	14	41.4	3.08	
Norman†	77	16	43.8	2.46	
Pawhuska	71	17	42.4	2.25	T.
Prudence†		10		3.25	
Putnam	76	13	44.2	1.33	
Sac and Fox Agency	78	11	45.3	1.73	T.
Stillwater†	73	15	43.6	3.00	T.
Waukomis	72	17	43.5	3.25	
Oregon.					
Albany *a*	68	31	47.0	7.05	
Arlington	65	28	44.4	0.57	
Ashland *b*	64	24	44.6	1.28	
Aurora	62	30	45.0	5.85	
Aurora (near)	63	29	45.5	6.26	T.
Bandon	64	33	49.2	8.27	
Bay City†	60	33	46.1	29.39	
Beulah	54	5	33.1	0.36	2.4
Brownsville	68	31	47.6	3.72	
Burns	51	4	30.2		
Burns (near)	61	12	38.7	0.11	0.2
Cascade Locks	56	34	43.2	14.48	
Comstock	67	31	47.3	3.93	
Corvallis	65	29	45.7	5.48	T.
Dayville†	65	21	43.8	0.52	0.2
Eugene	68[f]	34[f]	45.8[f]	3.45	
Fairview	60	33	46.8	8.09	
Falls City	63	29	43.9	12.65	T.
Fife	55	0	31.2	0.40	4.0
Forestgrove	64	29	43.0	7.81	1.0
Fort Klamath	55	7	31.0	2.31	10.2
Gardiner		36		13.25	
Glenora	57	28	41.0	23.86	11.5
Government Camp	51	16	34.4	12.94	54.0
Grants Pass *a*†	66	24	45.0	3.70	
Happy Valley	60	3	35.4		
Heppner	64	24[e]	43.0[e]	0.75	0.9
Hood River (near)	58	30	42.0	5.83	5.0
Jacksonville	65	25	43.2	2.35	0.2
Joseph	54	10	31.4	0.80	7.5
Junction City	66	30	47.9	3.49	
Klamath Falls	54	16	36.1	0.91	1.0
Lafayette	60	30	43.9	4.67	
Lagrande	57	18	37.8	0.77	3.0
Lakeview†	59	10	34.9	1.08	1.5
Langlois	68	31	50.1	22.12	
Lone Rock	57	18	39.3	0.78	1.0
Lorella	58	− 6	33.1	0.30	
McMinnville	62	30	45.6	6.65	T.
Merlin	66	26	42.6	2.97	
Monmouth	66	32	44.8	2.06	
Monroe	66	31	46.1	5.46	
Moro	59	27	40.3	0.36	0.2
Mount Angel†	63	32	46.0	6.56	0.5
Newberg	62	28	45.0	7.57	
Newbridge	57	6	35.4	0.63	1.5
Newport	63	27	47.2	13.01	
Pendleton	66	25	45.6	1.33	1.0
Prineville	72	11	43.8	0.71	0.1
Riddles	68	28	45.5	2.59	
Riverside	63	4	35.8	0.25	2.0
Salem *b*†	67	28	45.2	5.64	
Sheridan	65	31	47.5	5.06	
Silver Lake	60	13	34.4	0.30	0.8
Silverton	64	34	44.5	6.43	0.5
Siskiyou	74	22	40.3	1.70	17.0
Sparta	52	15	31.8	2.15	17.0
Springfield	65	34	45.6	3.12	
Stafford	60	32	44.6	7.42	
The Dalles†	65	28	44.0	0.98	
Tillamook Rock				6.91	
Toledo	64	28	45.4	10.60	0.2
Umatilla				0.63	
Vale	56	0	34.8	0.37	0.5
Vernonia	70	23	42.4	8.91	8.0
West Fork	62	30	43.3	4.18	
Weston	64	22	44.2		
Williams	66	22	44.0	3.16	
Pennsylvania.					
Altoona	60	− 1	27.9	1.23	
Aqueduct	60	− 2	33.2	1.78	2.9
Beaver Dam				2.01	
Bethlehem				3.17	2.8
Brookville†				1.69	11.8
Browers Lock				4.05	
Cameron				1.17	6.0
Carlisle	60	1	31.2	2.09	0.5
Cassandra	58	0	28.4	1.85	17.5
Cedarrun				1.60	8.0
Centerhall†	51	− 4	26.7	1.16	9.5
Chambersburg†	59	− 2	29.2	1.38	
Coatesville	65	− 1	32.8	3.48	1.3
Confluence†	72	−10	27.6	2.40	16.0
Coopersburg	66	2	35.0	3.82	0.5
Davis Island Dam†				1.91	
Derry Station	71	− 7	29.8	1.98	5.6
Doylestown				3.62	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Pennsylvania—Cont'd.	°	°	°	*Ins.*	*Ins.*
Drifton	54	− 4	27.6		
Driftwood				1.95	
Duncannon				1.73	2.0
Dushore	54	−16	26.8	1.91	8.5
Dyberry	53	−12	25.5	3.12	11.5
East Bloomsburg				1.20	0.6
East Mauch Chunk	60	−10	29.6	1.87	1.5
Easton	52	2	31.3	3.70	3.0
Ellwood Junction†				2.25	6.2
Emporium	58	−11	27.0	1.47	10.2
Everett	61	− 1	28.6	1.17	5.5
Farrandsville				1.38	7.0
Forks of Neshaminy	62	4	34.6	3.99	
Franklin	64	− 6	27.0	1.48	6.0
Frederick				3.34	
Freeport†				2.30	5.0
Girardville				1.77	9.8
Grampian	56	− 8	25.0	2.06	16.0
Greensboro†	70	− 9	31.6	2.06	6.0
Greenville	62	− 6	29.4	3.27	10.8
Hamburg	57	0	31.6	1.74	1.0
Hawley	59	− 8	27.2	1.71	12.9
Hollidaysburg	63	− 4	29.2	1.21	5.5
Huntingdon *a*†	58	− 5	29.6	1.47	7.5
Huntingdon *b*				1.12	5.9
Indiana	70	− 4	29.0	1.44	10.3
Irwin				1.47	
Johnstown†	64	− 4	29.4	2.78	12.0
Karthaus				1.18	16.0
Keating				1.32	8.3
Kennett Square	63	0	33.4	3.43	0.2
Lansdale				3.04	
Lawrenceville	56	−11	27.2	1.26	5.8
Lebanon	57	− 1	31.4	1.59	1.7
Leroy†	58	−10	26.4	2.05	9.7
Lewisburg	56	− 7	28.8	2.27	3.0
Lock Haven *a*†	59	− 2	29.6	2.23	13.0
Lock Haven *b*				1.51	8.0
Lock No. 4†				1.71	4.1
Lycippus	72	− 4	30.0	1.80	12.2
Mifflin				1.50	1.0
Oil City†				2.53	12.2
Ottsville				3.20	
Parker†				2.52	9.5
Philadelphia *b*	61	7	36.0	3.20	1.0
Point Pleasant				3.34	
Pottstown	58	2	33.2	3.55	0.5
Quakertown	59	− 6	30.3	3.64	1.0
Reading			30.2	2.15	
Reedsville	45	− 4	27.8		
Renovo *a*				1.41	5.7
Renovo *b*	57	− 4	29.0	1.71	8.7
Ridgway†				1.37	16.0
Saegerstown	61	− 8	26.0	3.02	19.5
St. Marys	54	− 6	23.8	1.24	10.0
Salem Corners	53	− 4	27.2	3.34	10.0
Scranton	57	− 2	29.1	2.41	12.0
Seisholtzville				3.01	
Selinsgrove	55	− 3	29.0	2.06	2.0
Shawmont				2.73	
Shinglehouse	65	−12	27.8	1.24	4.0
Sinnamahoning				1.11	
Smethport	61	−10	25.6	1.35	7.0
Smiths Corners				3.27	
Somerset	63	− 8	25.7	3.11	14.4
South Bethlehem	56	1	31.0		
South Eaton	57	− 4	28.8	1.43	3.0
State College	55	0	27.5	1.14	4.1
Sunbury				0.30	
Swarthmore	59	4	33.3	2.95	
Swiftwater	51	− 5	26.0	3.35	2.0
Towanda	58	− 4	28.6	1.48	6.0
Trout Run				3.56	9.0
Uniontown				1.73	5.0
Warren†	59	−10	28.0	1.69	11.1
Wellsboro†	58	−10	28.2	1.33	7.5
West Chester	59	4	33.2	3.74	
West Newton†				1.98	7.0
Westtown	59	2	32.3	3.25	T.
White Haven	53	−12	26.5	1.56	4.0
Wilkesbarre†	56	1	30.9	0.96	0.8
Williamsport	55	− 2	29.0	1.52	2.8
York†	61	1	31.1	1.15	1.6
Rhode Island.					
Bristol	48	4	32.0	6.60	8.5
Kingston	52	− 2	30.0	8.13	7.0
Lonsdale				5.27	11.5
Pawtucket	55	− 4	33.7	6.53	19.0
Providence *a*	54	0	32.9	6.45	11.5
Providence *b*	54	1	30.8	6.10	9.0
South Carolina.					
Anderson†				0.95	
Batesburg†	73	11	45.3	0.62	
Blackville†	78	14	46.7	0.52	
Camden†				1.01	
Cheraw *a*†	75	10	42.2	1.22	

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
South Carolina—Cont'd.	°	°	°	*Ins.*	*Ins.*
Cheraw *b*†	.....	.....	.....	1.48	
Clemson College	71	10	41.0	0.97	
Conway†	.....	.....	.....	1.82	
Darlington (near)	.....	.....	.....	1.09	T.
Edisto†	.....	.....	.....	0.81	
Effingham†	.....	.....	.....	0.84	
Florence†	70	16	44.2	0.69	
Gaffney†	.....	.....	.....	0.73	
Georgetown†	73	19	47.6	2.00	
Gillisonville	78	12	49.0	0.74	
Greenville†	74	12	40.2	0.80	
Greenwood	73	15	43.0	0.57	
Holland	72	11	40.5	1.03	
Kingstree *a*†	74	14	42.6	1.04	
Kingstree *b*	.....	.....	.....	1.04	
Little Mountain	76	11	44.1	0.64	
Longshore†	72	11	42.2	0.83	
Mount Carmel†	.....	.....	.....	0.43	
Pinopolis *1	72	20	46.7	0.67	
Port Royal†	72	24	50.9	0.52	
St. George†	75	17	46.0	0.34	
St. Matthews†	77	11	44.8	0.88	
St. Stephens†	.....	.....	.....	0.75	
Santuck†	71	10	41.4	0.96	T.
Shaws Fork	77	11	44.9	0.66	
Smiths Mills†	.....	.....	.....	1.45	
Society Hill†	72	16	43.5	1.19	T.
Spartanburg	70	14	39.8	0.70	
Statesburg†	75	17	45.6	1.12	
Trenton	72	20	47.5	0.52	
Trial	75	12	45.6	0.62	
Walhalla	75	10	40.8	0.60	T.
Winnsboro	73	11	42.6	0.59	
Yemassee†	76	18	48.0	0.90	
Yorkville	74	14	44.5	1.07	
South Dakota.					
Aberdeen†	55	−19	19.0	0.10	1.0
Alexandria†	55	− 9	22.4	0.22	3.0
Armour	54	− 8	24.0	0.53	5.0
Ashcroft†	59	−14	28.4	0.45	1.5
Bowdle	61	−22	18.3	0.10	1.0
Brookings†	52	−14	19.9	0.55	5.5
Canton	46	− 9	22.4	0.50	4.5
Centerville	.....	.....	.....	0.39	4.6
Chamberlain†	59	− 5	28.0	0.05	0.5
Clark	.....	.....	.....	0.10	1.0
De Smet	50	− 8	20.2	0.70	7.0
Doland	52	−16	20.6	0.20	2.0
Edgemont	.....	.....	.....	0.20	2.0
Eureka	55	−23	15.6	0.32	5.0
Farmingdale	.....	.....	.....	0.13	.....
Flandreau	59	−11	20.5	0.50	5.2
Forestburg†	57	−12	21.7	0.30	3.0
Forest City	62	− 7	23.2	0.10	1.0
Fort Meade†	60	− 5	30.9	0.15	1.4
Gann Valley	54	− 8	24.4	0.10	1.0
Gary	58	−14	16.0	0.66	7.0
Goudyville	60	−14	21.9	0.20	2.0
Greenwood	56	− 5	26.0	0.55	4.5
Harney	60°	− 8°	31.3°	0.14	2.0
Highmore	59	−10	22.4	0.01	.....
Hotch City†	61	− 1	28.4	0.03	T.
Hot Springs	54	3	32.4	0.43	4.8
Howard†	50	−15	21.0	0.25	2.5
Interior	63	− 8	31.6	0.00	
Ipswich	58	−25	19.6	0.22	2.1
Kimball†	54	− 8	25.6	0.48	4.3
Leslie†	62	−20	24.0	T.	T.
Mellette†	56	−14	20.7	0.04	0.5
Menno†	52	− 7	24.4	0.39	4.0
Millbank	58	−16	17.4	0.52	5.2
Mitchell†	53	− 9	25.6	0.23	2.8
Oelrichs†	65	− 6	32.0	0.25	2.5
Parker†	42	− 9	20.2	0.25	2.5
Parkston	53	−10	23.6	0.40	4.0
Plankinton†	66	− 9	22.6	0.33	3.5
Redfield	66	−11	22.4	0.10	1.0
Rochford	57	− 5	28.6	0.90	9.0
Rosebud	63	− 3	30.8	0.15	0.0
Shiloh	60	−10	29.4	0.02	0.2
Silver City	.....	.....	.....	0.97	6.0
Sioux Falls†	46	−11	20.6	0.17	1.7
Spearfish†	61	0	31.8	0.45	5.0
Tyndall†	51	− 8	24.7	0.75	7.5
Watertown	50	−15	18.2	0.35	3.5
Wentworth†	51	−13	20.8	0.38	3.8
Wessington Springs*	49	−10	19.4	0.52	5.2
Wolsey	.....	.....	.....	0.45	4.5
Tennessee.					
Andersonville	66	6	37.2	1.08	T.
Ashwood *† 1	70	12	42.5	1.15	1.0
Benton (near)†	65	8	39.2	0.70	T.
Bluff City†	.....	.....	.....	0.81	6.0
Bolivar†	71	12	42.0	1.69	T.
Bristol†	65	− 6	33.4	0.97	1.5
Byrdstown	69	5	38.3	1.76	6.3

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Tennessee—Cont'd.	°	°	°	*Ins.*	*Ins.*
Carthage†	69	8	40.8	1.38	1.7
Charleston	.....	.....	.....	0.86	1.0
Clarksville	70	8	40.6	0.69	0.7
Clinton†	.....	.....	.....	0.86	3.0
Decatur†	64	8	39.1	0.97	2.3
Dover	74	8	41.9	1.26	T.
Dyersburg	68	16	42.5	1.88	T.
Elizabethton†	68	0	34.6	1.04	2.0
Elk Valley	67	3	37.6	1.41	8.1
Erasmus	.....	− 5	.....	1.56	7.5
Fairmount *5	58°	6°	36.4°	0.96	1.2
Florence†	70	9	40.9	0.80	T.
Franklin	70	9	40.5	0.63	T.
Grace *1	70	6	41.8	1.95	5.0
Greeneville†	67	1	37.0	0.66	1.6
Harriman	68	8	38.6	0.87	2.0
Hohenwald†	71	8	41.2	1.29	T.
Jackson†	69	14	43.1	2.40	T.
Johnsonville	74	10	42.3	0.98	0.7
Jonesboro *1	63	− 2	35.2	0.99	2.3
Kingston†	.....	.....	.....	0.60	1.4
Lafayette	.....	.....	.....	1.25	6.0
Liberty†	72	10	40.4	1.21	0.8
Lynnville†	70	11	41.1	1.48	T.
McKenzie†	72	11	42.0	1.24	T.
McMinnville†	67	6	39.9	0.47	0.8
Newmarket *5	67	7	38.4	0.83	1.8
Newport†	67	8	38.1	0.94	1.0
Nunnelly	72	8	41.8	0.71	T.
Oak Hill *1	68	0	38.9	1.87	3.9
Palmetto†	71	10	41.9	0.97	0.2
Peryear *5	70	10	41.8	1.50	T.
Pope	74	10	42.4	0.84	T.
Rogersville†	65	5	36.8	1.18	1.8
Rugby	62	− 2	35.2	2.57	15.0
Savannah	72	13	42.8	1.35	T.
Sewanee†	64	4	37.8	1.76	1.5
Silver Lake	.....	.....	.....	0.99	6.4
Springdale	68	2	37.6	0.84	3.1
Sylvia	72	5	40.1	1.04	T.
Tazewell	.....	.....	.....	0.97	5.7
Tellico Plains†	70	8	40.4	0.73	1.7
Tracy City	63	5	37.1	1.33	4.0
Trenton	67	12	41.6	1.99	T.
Tullahoma†	67	8	39.8	1.23	1.2
Waynesboro	71	10	41.2	1.61	
Wildersville	71	12	43.2	1.48	T.
Yukon	70	10	41.4	1.29	T.
Texas.					
Albany *1	74	22	49.8	1.00	
Anson	84	15	51.4	1.05	
Arthur City†	.....	.....	.....	0.56	
Austin *a*	75	33	55.8	1.70	
Austin *b* *5	76	28	53.3	.....	
Ballinger†	85	18	50.4	0.26	
Beeville†	86	34	60.7	2.80	
Blanco†	84	30	57.5	0.85	
Boerne *1	80	29	55.2	1.24	
Brazoria†	81	34	59.0	3.38	
Bremond *1	78	30	54.6	2.35	
Brenham†	81	28	56.0	6.65	
Brighton	79	.....	.....	1.21	
Brownwood	80	22	52.2	0.50	
Burnet *1	76	29	52.0	0.71	
Camp Eagle Pass†	90	34	61.9	0.39	
Childress	82	18	47.6	2.58	
Coleman	83	18	51.6	0.55	
College Station	78	28	55.2	5.43	
Colmesneil	.....	.....	.....	3.11	
Columbia†	80	31	57.2	2.69	
Conroe	80	30	56.0	4.53	
Corsicana *b*†	80	22	52.3	2.56	
Cuero†	71	33	54.4	2.65	
Dallas†	78	17	49.8	2.05	
Danevang†	80	32	57.5	4.13	
Dublin†	81	18	50.4	0.50	
Duval *1	82	30	58.8	1.88	
Emory	71	15	48.8	3.17	
Estelle†	.....	.....	.....	1.70	
Fort Brown	88	40	63.6	2.43	
Fort Clark	84	34	57.8	0.53	
Fort McIntosh	90	37	63.6	1.56	
Fort Ringgold†	92	34	64.0	0.73	
Fort Stockton	.....	.....	.....	0.00	
Fort Worth	.....	.....	.....	1.08	
Fredericksburg *† 1	82f	26	53.7f	0.54	
Fruitland	81	17	50.8	1.14	
Gainesville	80	16	51.1	1.17	
Georgetown *1	78	26	53.0°	2.39	
Golindo	.....	.....	.....	1.55	
Grapevine	83	17	52.0	1.19	
Hale Center†	77	17	45.6	0.20	T.
Hallettsville†	81	33	58.2	3.03	
Haskell	86	18	50.6	1.53	
Hewitt	.....	.....	.....	0.75	
Houston†	80	35	57.2	3.49	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Texas—Cont'd.	°	°	°	*Ins.*	*Ins.*
Huntsville†	79	28	53.6	5.15	
Jacksonville	77	21	53.8	3.41	
Jasper	85	29	57.0	4.40	
Kent	.....	.....	.....	0.00	
Kerrville	82	23	51.6	0.35	
Lampasas†	82	22	52.9	0.78	
Llano *† 5	84	29	55.1	0.50	
Longview†	78	25	52.4	2.86	
Luling†	81	32	57.0	4.87	
Mann	79	20	54.6	2.03	
Marathon	79	.....	.....	0.00	
Marshall	76	23	53.4	3.19	
Menardville	85	19	52.8	0.35	
Missouri City	81	32	59.4	3.33	
Mount Blanco†	80	15	44.7	0.06	
New Braunfels†	80	31	57.0	1.16	
Panter	.....	.....	.....	1.43	
Point Isabel *1	82	58	66.6	0.15	
Rheinland†	82	24	49.1	2.68	
Roby	.....	.....	.....	1.42	
Rockport *1	78	46	61.6	.....	
Rocksprings	.....	.....	.....	0.20	
Runge†	84	33	60.0	3.30	
San Antonio	86	33	59.9	1.22	
San Marcos *b*†	81	27	54.8	0.54	
Sulphur Springs†	81	18	53.4	2.35	
Temple *a*	80	23	53.3	2.58	
Tulia	79	14	42.2	0.18	1.0
Tyler	76	19	50.4	3.08	
Valentine†	.....	.....	.....	0.00	
Victoria	.....	.....	.....	3.40	
Waco†	81	24	53.4	1.51	
Waxahachie†	81	16	50.5	2.80	
Weatherford†	79	19	51.0	2.15	
Wichita Falls†	.....	.....	.....	2.00	
Utah.					
Alpine†	.....	.....	.....	0.45	.....
Blue Creek *5	54	12	29.9	T.	T.
Brigham †	.....	.....	.....	0.76	.....
Cisco†	47	−10	16.4	T.	T.
Corinne	54	1	29.4	0.15	.....
Ferron	55	0	31.0	0.40	4.0
Fillmore†	64	0	32.0	1.20	.....
Fort Duchesne†	37	−21	8.2	0.10	1.0
Frisco	56	14	36.4	0.10	1.0
Giles†	54	−10	21.9	0.20	2.0
Heber	54	− 8	25.4	0.50	5.0
Huntsville	.....	.....	.....	0.67	
Kelton *5	57	7	29.7	0.00	
Levan†	55	4	30.7	0.25	1.5
Loa†	54	−15	25.2	0.00	
Logan†	49	5	29.5	0.52	.....
Millville	.....	.....	.....	0.53	.....
Minersville	50	7	32.0	0.57	2.0
Moab†	59	0	28.6	0.13	1.0
Mount Pleasant†	57	5	33.4	0.70	7.0
Ogden *a*	52	12	32.5	.....	1.0
Ogden *b*	64	10	35.4	0.19	1.5
Pahreah	66	− 2	33.4	0.20	2.0
Parowan†	58	2	32.4	1.20	12.0
Pinto	57	− 2	31.0	0.68	4.5
Promontory *5	56	5	29.9	0.05	0.5
Provo	63	1	35.7	0.64	.....
Richfield†	62	5	29.6	0.30	3.0
St. George†	79	20	44.3	0.56	
Scipio†	58	− 5	29.5	1.62	6.0
Snowville	50	− 3	26.4	0.30	0.0
Soldier Summit †	51	− 5	24.0	0.68	6.8
Terrace *5	43	0	23.0	0.30	3.0
Thistle	57	3	29.4	0.30	3.0
Tooele†	56	14	33.8	0.34	....
Tropic	.....	.....	.....	0.40	4.0
Vernal	42	−12	15.0	0.47	5.0
Vermont.					
Bennington	49	−18	25.9	3.22	23.2
Brattleboro	51	−22	25.1	4.94	40.5
Burlington†	44	− 7	25.9	2.98	29.0
Chelsea†	45	−13	23.5	4.78	44.0
Cornwall	45	− 9	24.6	2.49	20.5
Enosburg Falls	56	−17	19.6	4.40	40.0
Hartland†	45	−30	22.2	4.22	32.0
Jacksonville	46	−25	21.6	3.87	26.0
Norwich	48	−21	24.0	4.41	30.5
St. Johnsbury	46	−25	22.8	2.64	20.8
Vernon *5	48	−23	24.9	4.68	25.0
Wells	44	−15	23.6	5.25	32.0
Woodstock	51	−28	23.8	3.49	39.0
Virginia.					
Alexandria	66	6	34.4	1.31	
Ashland†	76	− 2	38.2	0.78	T.
Barboursville	78	8	37.8	0.72	T.
Bedford City	70	7	37.6	1.02	T.
Bigstone Gap†	67	− 5	35.8	1.85	3.7
Birdsnest *† 1	65	16	39.3	1.15	T.
Blacksburg	70	0	32.9	0.88	0.8
Buckingham†	69	6	34.3	0.40	T.

TABLE II.—*Meteorological record of voluntary and other cooperating observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Virginia—Cont'd.	°	°	°	*Ins.*	*Ins.*
Burkes Garden	...	.....	.....	0.98	3.2
Callaville†	67	7	37.3	0.70	
Christiansburg	.....	.....	.....	0.39	
Clifton Forge	69	8	34.4	0.51	0.5
Dale Enterprise†	67	— 1	32.2	0.61	T.
Doswell	72	— 5	35.2	0.79	T.
Dwale	.....	.....	.....	1.63	2.2
Farmville †	72	17	39.4	.....	T.
Fredericksburg†	71	— 4	35.8	1.19	2.0
Grahams Forge	66	1	32.8	0.60	0.5
Guinea	.....	.....	.....	0.90	T.
Hampton	65	15	41.0	1.49	
Hot Springs	75	— 4	35.2	0.79	T.
Leesburg	.....	.....	.....	0.60	
Lexington†	68	4	34.8	0.77	0.5
Maidens	70	8	37.8	1.15	
Manassas†	68	0	34.2	1.22	T.
Marion†	67	— 3	34.8	0.95	1.5
Monterey	62	0	29.0	1.22	2.2
Petersburg†	72	9	39.0	0.78	T.
Radford	.....	.....	.....	0.78	T.
Richmond (near)†	68	6	37.4	0.81	T.
Rockymount†	70	8	38.4	0.60	T.
Salem†	69	9	39.2	0.58	T.
Speers Ferry	.....	.....	.....	2.19	5.0
Spottsville†	68	9	38.7	1.26	
Stanardsville†	67	5	34.2	0.65	
Staunton†	73	5	35.4	0.55	T.
Stephens City†	68	4	33.9	1.22	T.
Sunbeam†	66	11	39.8	1.11	
Warrenton	64	11	36.4	0.53	
Warsaw†	66	3	35.8	1.33	1.0
Westbrook Farm	67	2	36.6	.....	.....
Westpoint	73	0	31.0	1.50	T.
Woodstock†	71	4	34.5	0.60	T.
Wytheville†	70	0	34.3	0.65	T.
Washington.					
Aberdeen	59	29	43.4	14.42	1.4
Anacortes	.....	.....	.....	2.88	
Ashford †	.....	.....	.....	11.06	17.0
Blaine†	62	22	38.6	5.54	1.5
Centerville†	65	22	40.0	1.08	0.6
Chehalis†	58	34	43.0	2.87	
Clearwater	56	31	43.4	25.05	3.3
Colfax	59	23	39.0	2.75	1.5
Coupeville†	65	31	44.0	2.82	T.
Dayton	66	24	43.6	1.69	
Ellensburg	55	12	35.4	0.47	.....
Ellensburg (near)	52	10	34.6	0.50	3.0
Fort Simcoe†	68	24	40.4	1.54	2.0
Fort Spokane	48	13	34.2	1.80	6.5
Grandmound†	59	29	43.2	8.24	1.0
Hunters†	48	5	30.6	2.33	8.5
Kennewick †	67	24	44.1	0.52	
La Center	61	32	44.6	9.13	1.5
Lakeside	55	18	35.2	1.59	10.0
Lapush	50	32	41.2	16.46	T.
Lind	59	12	38.2	0.81	2.0
Loomis†.	55	13	35.1	1.00	4.0
Madrone †	64	28	44.9	7.26	
Mayfield †.	66	26	43.6	9.03	
Moxee Valley†	65	17	40.2	0.51	0.1
New Whatcom	67	29	45.4	2.40	0.2
Northbend	55	21	42.6	10.92	2.0
Olga	60	30	43.8	3.93	0.5
Olympia†	61	30	44.0	9.47	
Orcas Island	58	28	44.8	2.47	
Pinehill†	61	28	40.9	2.69	1.0
Pomeroy	.....	30	.....	1.39	0.5
Port Townsend	64	33	45.0	2.64	T.
Pullman†	56	23	37.2	3.24	3.0
Rosalia†	55	18	37.0	1.96	4.8
Sedro†	69	29	45.1	6.13	
Shoalwater Bay *10	55	34	45.2	.....	
Snohomish†	65	32	45.0	7.70	1.5
Southbend	60	32	44.6	16.57	T.
Stillaguamish	67	26	42.6	7.14	0.5
Sunnyside†	69	22	41.4	0.14	T.
Union City†	58	30	43.0	16.30	2.0
Vashon†	61	31	44.3	8.35	
Waterville†	55	9	32.0	1.42	6.0
West Virginia.					
Beverly†	64	—12	30.4	2.87	7.0
Bluefield†	67	— 4	34.4	0.98	2.9
Buckhannon *a*†	.....	.....	.....	2.68	9.5
Buckhannon *b*	66	—10	32.5	.....	.....
Burlington †	73	2	32.3	1.45	1.5
Charleston †	.....	.....	.....	1.93	2.0
Dayton †	67	— 9	31.6	1.92	3.0
Eastbank	72	— 2	36.5	1.75	4.0
Elkhorn†	72	— 6	35.2	1.16	5.8
Fairmont†	.....	.....	.....	2.10	8.0
Glenville†	68	— 8	32.0	2.82	12.6
Grafton†	71	— 3	32.2	2.45	8.9
Green Sulphur	65	— 1	32.4	0.86	0.8
Harpers Ferry	.....	.....	.....	1.49	0.5

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
West Virginia—Cont'd.	°	°	°	*Ins.*	*Ins.*
Hinton *a*†	.....	.....	.....	0.91	4.0
Hinton *b*†	66	— 4	33.8	.....	1.5
Huntington	70	1	34.3	2.38	1.0
Kingwood	65	— 4	29.8	2.56	.....
Marlinton †	63	— 9	30.0	1.47	3.0
Martinsburg†	62	1	32.3	1.29	.....
Morgantown *b*†	72	— 5	33.4	1.68	2.0
New Martinsville†	72	— 3	33.2	1.88	4.8
Nuttallburg	70	—13	34.2	.....	.....
Oldfields†	67	0	31.2	1.05	T.
Point Pleasant†	71	1	35.0	1.93	1.0
Powellton	68	0	33.9	2.07	6.3
Romney	64	6	32.8	1.09	
Rowlesburg†	.....	.....	.....	2.12	10.4
Upper Tract	74	4	34.0	0.64	T.
Weston *a*	.....	.....	.....	3.15	6.0
Weston *b* *†[1]	69	— 8	31.4	.....	9.0
Wheeling *a*†	.....	.....	.....	2.50	6.3
Wheeling *b*†	67	2	33.6	2.50	4.5
Wisconsin.					
Amherst	42	—11	18.8	1.17	11.6
Barron	45	—24	17.0	1.83	12.0
Bayfield	44	—10	19.0	1.80	18.0
Beloit	46	— 7	24.0	1.29	14.0
Brodhead	46	— 9	22.6	2.04	14.0
Butternut	59	—22	18.9	1.93	10.9
Chilton	45	—11	22.4	0.91	18.0
Citypoint	43	—20	19.6	1.35	10.0
Delavan	49	—13	22.4	1.17	11.0
Dodgeville†	44	— 9	21.6	1.62	19.5
Easton	41	—11	19.8	0.65	8.5
Eau Claire	44	—12	20.2	2.26	11.5
Florence †	42	—12	12.8	1.38	11.0
Fond du Lac	.....	— 9	.....	0.98	9.2
Grand River Locks	.....	.....	.....	0.62	10.0
Grantsburg†	49	—22	17.2	0.45	4.5
Gratiot	45	—15	21.7	1.60	11.0
Hartford	.....	.....	.....	2.52	19.0
Hartland	46	—11	22.4	1.84	21.8
Harvey	45	—10	23.3	1.34	10.8
Hayward	42	—27	18.6	0.98	5.6
Hillsboro	48	— 9	20.5	2.06	16.5
Kenosha *[10]	44	—10	23.3	.....	.....
Knapp	45	—13	20.1	1.04	.....
Koepenick *†[1]	48	—16	19.0	2.20	19.0
Lancaster†	45	— 8	21.2	1.56	18.5
Lincoln †	40	0	23.0	1.40	6.0
Madison†	41	— 8	20.3	2.42	21.9
Manitowoc†	44	— 7	23.4	1.20	12.2
Meadow Valley†	43	—17	18.2	0.63	10.0
Medford †	55	—22	17.6	.....	.....
Menasha	.....	.....	.....	0.70	13.8
New Holstein	43	—10	19.7	1.80	11.0
New London	41	—11	20.1	0.75	5.0
North Crandon	.....	.....	.....	1.40	12.0
Oconto	43	— 7	23.0	.....	.....
Osceola†	45	—11	18.5	1.13	5.3
Pepin	45	—14	18.6	1.48	15.0
Pine River†	42	—11	20.6	1.00	10.4
Portage†	40	—12	19.0	0.74	10.0
Port Washington	46	—11	24.6	3.76	33.0
Prairie du Chien	50	— 7	25.0	1.44	14.0
Racine	45	— 9	26.0	2.37	38.0
Sharon	48	— 8	20.8	2.26	20.5
Shawano	42	— 9	20.8	0.99	10.2
Spooner	47	—22	18.6	1.85	12.0
Stevens Point†	49	—13	19.8	1.19	8.2
Sturgeon Bay Canal *[9]	44	— 8	21.9	.....	.....
Valley Junction†	42	—15	19.2	1.83	16.5
Viroqua	42	— 8	21.4	2.19	20.0
Watertown†	45	—12	22.1	3.14	22.5
Waukesha†	44	—10	23.2	1.60	11.9
Waupaca†	39	—10	20.3	0.75	14.5
Wausau †	45	—16	17.8	2.09	18.5
Westbend	46	— 2	25.8	1.62	16.2
Westfield †	42	—10	21.1	1.20	10.0
White Mound †	45	—12	22.1	1.90	14.0
Wyoming.					
Big Horn Ranch	53	— 4	29.3	0.18	3.0
Carbon	52	2	27.8	0.02	0.2
Embar	57	— 3	30.0	0.10	1.0
Fort Laramie†	62	— 3	32.4	0.26	0.5
Fort Washakie	59	— 1	29.6	0.00	
Fort Yellowstone†	45	1	25.2	1.21	12.1
Green River	65	—11	31.6	0.00	
Laramie	49	2	25.6	0.01	.....
Lovell	59	— 5	29.4	0.12	2.2
Lusk†	59	— 6	29.2	0.46	3.0
Otto	60	0	29.0	T.	T.
Sheridan	57	1	27.5	1.65	16.5
Sundance	45	— 6	27.2	0.85	7.0
Wamsutter	40	— 8	22.8	0.00	
Wheatland	63	1	36.4	T.	T.
Mexico.					
Ciudad P. Diaz	84	42	61.9	0.40	
Leon de Aldamas	77	38	57.5	0.67	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Mexico—Cont'd.	°	°	°	*Ins.*	*Ins.*
Topolobampo *[1]	81	56	66.9	0.00	
New Brunswick.					
St. John	39	2	26.2	3.95	24.8
West Indies.					
Grand Turk Island	.....	.....	.....	0.70	

Late reports for January, 1898.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Alaska.					
Killisnoo	38	23	31.1	4.40	23.5
Arizona.					
Oro	.....	.....	.....	1.45	
Arkansas.					
Brinkley	72	28	48.3	10.92	
Mena *[1]	70	16	46.7	2.87	
California.					
Folsom *b* *[1]	64	28	42.6	0.90	T.
Upperlake	67	15	40.4	0.93	2.0
Walnut Creek	61	24	43.4	1.29	
Colorado.					
Vilas	.....	.....	.....	0.03	0.3
Indiana.					
Logansport *b*	.....	.....	.....	1.43	6.4
Kansas.					
Hays	75	.....	.....	1.25	12.5
Oberlin	.....	.....	.....	0.00	
Massachusetts.					
Lynn *a*	53	0	26.2	.....	.....
Missouri.					
Maryville	48	5	26.2	.....	.....
Montana.					
Bozeman Ex. Station	43°	— 6	22.4°	0.42	.....
Butte	41	— 9	18.8	0.57	5.7
Dupuyer	.....	.....	.....	0.40	4.0
Hogan	50	— 2	23.2	0.70	7.0
Nebraska.					
Burchard	.....	.....	.....	1.25	12.5
Kearney	.....	.....	.....	0.17	1.5
Madison	47	3	26.9	.....	.....
Turlington	39	— 2	22.2	.....	.....
Nevada.					
Verdi	.....	.....	.....	0.50	5.5
New York.					
Nunda	59	— 8	26.7	3.85	19.5
North Carolina.					
Abshers	73	11	41.2	3.02	0.5
Horse Cove	68	7	40.8	5.78	1.5
Oregon.					
Salem *b*	.....	.....	.....	3.43	3.0
Tillamook Rock	.....	.....	.....	4.12	
South Dakota.					
Britton	55	2	23.4	0.00	
Gary	42	— 4	22.6	0.00	
Virginia.					
Warrenton	.....	.....	.....	2.04	5.0
Washington.					
Sedro	.....	.....	.....	3.96	T.
Wisconsin.					
Shawano	43	— 5	22.4	.....	.....

EXPLANATION OF SIGNS.

* Extremes of temperature from observed readings of dry thermometer.

† Weather Bureau instruments.

A numeral following the name of a station indicates the hours of observation from which the mean temperature was obtained, thus:

[1] Mean of 7 a. m. + 2 p. m. + 9 p. m. + 9 p. m. ÷ 4.
[2] Mean of 8 a. m. + 8 p. m. ÷ 2.
[3] Mean of 7 a. m. + 7 p. m. ÷ 2.
[4] Mean of 6 a. m. + 6 p. m. ÷ 2.
[5] Mean of 7 a. m. + 2 p. m. ÷ 2.
[6] Mean of readings at various hours reduced to true daily mean by special tables.
[7] Mean from hourly readings of thermograph.
[8] Mean of 7 a. m. + 2 p. m. + 9 p. m. ÷ 3.
[9] Mean of sunrise and noon.
[10] Mean of sunrise, noon, sunset, and midnight.

The absence of a numeral indicates that the mean temperature has been obtained from daily readings of the maximum and minimum thermometers.

An italic letter following the name of a station, as "Livingston *a*," "Livingston *b*," indicates that two or more observers, as the case may be, are reporting from the same station. A small roman letter following the name of a station, or in figure columns, indicates the number of days missing from the record; for instance, "*a*" denotes 14 days missing.

CORRECTIONS.

Tennessee, Nunnelly, December, 1897, make precipitation read 4.33 instead of 4.31.

TABLE III.—*Data furnished by the Canadian Meteorological Service, February,* 1898.

Stations.	Pressure.			Temperature.				Precipitation.			Stations.	Pressure.			Temperature.				Precipitation.		
	Mean not reduced.	Mean reduced.	Departure from normal.	Mean.	Departure from normal.	Mean maximum.	Mean minimum.	Total.	Departure from normal.	Depth of snow.		Mean not reduced.	Mean reduced.	Departure from normal.	Mean.	Departure from normal.	Mean maximum.	Mean minimum.	Total.	Departure from normal.	Depth of snow.
	Ins.	*Ins.*	*Ins.*	°	°	°	°	*Ins.*	*Ins.*			*Ins.*	*Ins.*	*Ins.*	°	°	°	°	°	*Ins.*	
St. Johns, N. F.	29.94	30.09	+.17	25.8	+3.8	32.7	18.8	8.45	.....	3.1	Saugeen, Ont.	29.32	30.08	+.02	23.1	+ 3.2	29.8	16.5	3.08	+0.64	27.8
Sydney, C. B. I.	30.08	30.12	+.17	25.8	+6.5	33.1	18.5	2.80	—1.39	13.0	Parry Sound, Ont.	29.33	30.07	.00	19.4	+ 5.1	29.5	9.2	3.20	+0.80	26.8
Halifax, N. S.	29.99	30.13	+.15	29.2	+6.8	35.7	22.7	4.47	—0.23	20.3	Port Arthur, Ont.	29.34	30.09	.00	10.6	+ 4.2	22.3	— 1.2	0.46	—0.87	4.6
Grand Manan, N. B.	30.01	30.06	+.08	29.4	+6.0	34.7	24.1	5.11	+1.55	31.8	Winnipeg, Man.	29.23	30.13	—.03	5.0	+ 6.6	17.4	— 7.5	1.07	—0.10	10.7
Yarmouth, N. S.	30.00	30.08	+.04	29.6	+3.8	35.1	24.1	2.91	—2.91	13.3	Minnedosa, Man.	28.18	30.14	—.01	5.6	+ 8.3	17.4	— 6.3	0.25	—0.73	2.5
Charlottet'n, P. E. I.	30.05	30.10	+.18	24.1	+6.5	30.5	17.7	0.88	—2.82	6.6	Qu'Appelle, Assin.	27.69	30.13	—.01	4.7	+ 5.3	15.1	— 5.7	0.40	—0.27	4.0
Chatham, N. B.	30.07	30.09	+.11	18.7	+6.2	28.4	8.9	2.49	—0.82	23.9	Medicine Hat, Assin.	27.64	30.07	—.07	16.0	+ 4.8	28.8	3.1	1.07	+0.63	10.7
Father Point, Que.	30.08	30.11	+.11	14.0	+2.5	22.9	5.0	3.26	+1.64	27.0	Swift Current, Assin.	27.36	30.11	—.03	12.3	+ 4.3	22.6	2.0	0.82	+0.06	8.2
Quebec, Que.	29.74	30.09	+.05	18.7	+6.9	25.1	12.4	5.12	+1.73	44.2	Calgary, Alberta	26.29	30.02	—.07	14.5	+ 1.0	25.1	3.8	0.90	+0.14	9.0
Montreal, Que.	29.85	30.07	+.02	19.9	+5.4	26.0	13.8	5.65	+2.83	46.3	Banff, Alberta	25.19	30.02	.....	19.3	.....	29.4	9.2	2.47	.....	24.7
Rockliffe, Ont.	29.55	30.09	+.03	16.4	+6.8	26.4	6.5	1.66	—0.66	15.8	Edmonton, Alberta	27.60	30.07	—.02	7.3	— 1.0	17.4	— 2.8	1.22	+0.76	12.2
Ottawa, Ont.	29.74	30.12	.....	19.0	+7.3	26.8	11.1	4.33	.....	34.3	Prince Albert, Sask.	28.49	30.14	.....	0.5	+ 3.5	11.6	—10.6	1.86	.....	18.6
Kingston, Ont.	29.74	30.08	.00	22.7	+4.9	30.2	15.1	1.49	—0.95	9.8	Battleford, Sask.	28.26	30.16	.....	0.0	— 0.1	9.5	— 9.6	1.58	.....	15.8
Toronto, Ont.	29.69	30.10	+.01	24.8	+3.3	32.0	17.6	3.06	+0.75	24.5	Kamloops, B. C.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
White River, Ont.	28.68	30.14	+.06	5.9	+5.7	20.3	— 8.5	2.02	+0.80	19.8	Esquimalt, B. C.	29.86	29.89	.....	43.6	+ 2.3	48.5	38.8	5.20	.....	1.5
Port Stanley, Ont.	29.40	30.07	—.02	25.1	+2.3	31.1	19.0	4.35	+1.43	33.0	Hamilton, Bermuda.	29.92	30.08	—.03	62.2	+ 0.7	66.8	57.7	4.61	.....	

TABLE IV.—*Mean temperature for each hour of seventy-fifth meridian time, February,* 1898.

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Bismarck, N. Dak.	12.3	11.3	10.8	9.6	9.2	8.5	8.3	8.4	7.7	8.8	11.8	15.9	19.4	22.1	24.1	25.6	26.3	25.9	24.0	20.9	18.5	16.8	14.9	13.7	15.6
Boston, Mass.	30.9	30.6	30.3	29.9	28.9	28.2	28.4	29.5	30.4	31.9	33.8	35.3	36.2	37.2	37.1	36.6	35.6	34.8	33.9	33.1	32.6	32.2	31.5	31.0	32.5
Buffalo, N. Y.	26.7	26.6	26.5	26.2	25.6	25.0	25.1	25.6	25.7	26.2	27.1	28.1	28.9	29.4	30.0	30.2	30.1	29.4	28.9	28.8	27.5	27.4	27.2	27.0	27.5
Chicago, Ill.	26.4	26.1	25.6	25.2	25.2	25.0	24.9	25.0	24.9	25.1	26.1	27.1	28.2	29.0	29.4	30.0	30.0	29.8	29.3	29.0	28.8	28.5	28.1	27.7	27.3
Cincinnati, Ohio	33.4	32.7	32.0	31.6	31.4	30.9	31.0	30.8	30.8	31.3	32.5	33.9	35.4	36.8	37.9	38.8	38.8	38.5	37.6	36.9	36.2	35.6	34.9	34.3	34.3
Cleveland, Ohio	27.3	26.9	26.4	25.8	25.1	25.2	25.1	25.3	25.4	26.5	27.8	29.1	29.7	30.8	30.9	30.9	31.0	30.3	29.9	29.5	29.1	28.8	28.4	28.2	28.1
Detroit, Mich.	25.0	24.6	24.2	24.1	23.9	23.8	23.8	24.1	24.5	25.4	26.3	27.2	27.8	28.6	29.2	29.5	29.6	29.2	28.3	28.1	27.0	26.7	26.4	26.1	26.4
Dodge City, Kans.	33.2	32.3	31.0	29.8	28.6	28.2	27.1	27.1	26.7	29.6	34.7	39.1	42.3	45.0	47.1	48.8	49.8	49.3	47.2	42.4	40.1	38.1	36.5	35.3	37.1
Eastport, Me.	27.1	27.0	26.5	26.1	25.9	25.6	25.5	25.4	26.0	26.8	27.9	28.9	29.5	30.2	30.5	30.6	30.3	30.0	29.5	29.2	28.8	28.4	28.0	27.6	28.0
Galveston, Tex.	58.0	57.6	57.2	56.8	56.2	56.1	55.6	55.9	56.0	56.6	58.0	59.6	60.7	61.6	61.8	62.1	61.8	61.0	60.4	59.8	59.5	59.2	58.8	58.6	58.7
Havre, Mont.	20.1	19.6	18.9	18.1	17.7	16.7	16.3	15.7	14.3	14.7	16.0	18.2	20.9	24.4	25.9	27.4	28.8	29.2	28.8	25.6	23.8	23.1	22.2	21.8	21.2
Kansas City, Mo.	33.0	32.4	31.7	31.0	30.5	30.0	29.7	29.6	29.8	30.8	32.8	34.9	36.8	38.5	40.2	41.3	41.8	41.8	40.6	38.9	37.7	36.8	35.7	34.6	35.0
Key West, Fla.	67.4	66.9	66.6	66.4	66.2	66.4	66.4	66.6	67.9	68.9	69.7	70.4	70.9	70.9	70.9	70.4	69.8	69.2	68.8	68.6	68.6	68.3	68.1	67.8	68.4
Memphis, Tenn.	43.8	43.1	42.4	41.8	41.1	40.7	40.3	40.2	40.0	41.1	42.9	45.1	46.9	48.4	49.7	50.6	51.3	51.1	49.6	48.2	47.3	46.5	45.6	44.8	45.1
New Orleans, La.	54.3	53.8	53.2	52.6	52.1	51.7	50.8	50.6	50.9	53.3	56.3	58.2	60.0	61.4	61.8	62.5	63.0	62.0	60.6	58.5	57.3	56.3	55.5	55.0	56.3
New York, N. Y.	31.2	30.6	30.0	29.4	29.2	29.1	29.0	29.2	30.0	31.2	32.8	34.6	35.8	36.1	36.5	36.9	36.0	35.0	34.4	34.0	33.1	32.7	32.1	31.6	32.5
Philadelphia, Pa.	32.9	32.3	31.6	31.1	30.8	30.4	30.1	31.0	32.4	33.7	35.7	37.6	39.4	40.5	41.3	41.5	40.8	39.2	37.7	36.5	35.0	34.4	33.8	33.3	35.1
Pittsburg, Pa.	29.9	29.3	28.9	28.3	28.1	28.2	28.2	28.7	29.1	30.5	31.9	33.5	35.1	35.9	37.0	37.0	36.6	35.9	34.9	34.3	33.1	32.4	31.4	30.6	32.0
Portland, Oreg.	45.2	44.9	44.8	44.8	44.6	44.4	44.1	43.9	43.3	42.9	43.0	43.9	45.1	46.2	46.7	47.2	47.9	48.8	48.8	48.0	47.6	47.1	46.5	45.9	45.6
St. Louis, Mo.	36.1	35.0	34.1	33.2	32.8	32.6	32.1	31.6	31.4	32.5	34.5	36.6	39.2	41.0	42.5	43.3	43.4	42.4	41.4	40.0	39.3	38.5	37.8	37.4	37.0
St. Paul, Minn.	19.8	19.1	18.3	17.9	17.2	16.7	16.3	16.0	15.5	15.8	17.5	19.5	21.4	22.6	24.1	25.2	26.0	25.7	25.1	24.3	23.4	22.8	22.1	21.8	20.6
Salt Lake City, Utah.	32.9	32.2	32.1	31.6	31.1	30.4	30.6	31.0	29.5	30.2	32.2	35.2	38.0	39.4	40.7	40.9	41.5	41.4	40.5	39.2	37.5	36.0	35.4	34.6	35.2
San Diego, Cal.	52.7	52.3	51.8	51.3	50.8	50.4	50.3	50.6	50.1	49.5	50.8	54.7	57.0	58.8	59.9	60.3	59.9	59.4	59.1	58.5	56.6	55.5	54.7	53.8	54.5
San Francisco, Cal.	51.9	51.4	50.8	50.6	50.1	49.6	49.3	48.8	48.4	48.2	48.3	49.5	50.5	51.3	53.1	54.8	56.0	56.1	56.3	55.2	54.1	53.4	53.0	52.4	51.8
Savannah, Ga.	47.1	46.1	45.0	44.4	43.9	43.3	43.0	43.2	45.8	49.8	53.6	56.5	58.2	59.2	59.2	59.2	58.1	55.6	53.3	52.1	51.1	50.1	49.1	48.0	50.6
Washington, D. C.	31.2	30.3	29.5	29.1	28.5	28.1	28.0	28.8	31.0	33.6	36.5	38.2	40.0	41.6	42.5	42.3	41.5	40.1	37.9	36.4	35.0	33.9	33.0	32.2	34.6

TABLE V.—*Mean pressure for each hour of seventy-fifth meridian time, February,* 1898.

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Bismarck, N. Dak.	28.281	.280	.280	.283	.280	.280	.279	.273	.269	.270	.272	.274	.269	.255	.242	.231	.228	.233	.239	.248	.252	.259	.265	.268	.263
Boston, Mass.	29.897	.889	.881	.881	.883	.894	.907	.916	.925	.929	.926	.911	.901	.897	.898	.900	.906	.917	.925	.929	.931	.933	.933	.931	.910
Buffalo, N. Y.	29.210	.206	.203	.199	.199	.203	.209	.216	.219	.222	.222	.215	.202	.192	.189	.188	.194	.202	.213	.218	.225	.227	.226	.225	.209
Chicago, Ill.	29.167	.162	.162	.158	.156	.160	.170	.182	.189	.191	.198	.195	.183	.172	.162	.161	.161	.166	.168	.169	.167	.164	.161	.155	.170
Cincinnati, Ohio	29.458	.454	.449	.441	.438	.441	.447	.454	.464	.469	.474	.472	.461	.449	.442	.441	.444	.451	.455	.461	.460	.462	.461	.456	.454
Cleveland, Ohio	29.236	.240	.233	.228	.229	.233	.234	.235	.241	.241	.241	.235	.221	.208	.206	.210	.219	.229	.245	.252	.250	.249	.246	.241	.233
Detroit, Mich.	29.270	.265	.261	.255	.252	.254	.256	.257	.266	.267	.267	.259	.256	.251	.248	.252	.256	.262	.275	.283	.281	.284	.278	.276	.264
Dodge City, Kans.	27.466	.468	.468	.468	.464	.464	.475	.474	.482	.480	.485	.484	.474	.455	.434	.419	.413	.409	.412	.425	.433	.439	.442	.443	.453
Eastport, Me.	29.908	.902	.902	.945	.940	.947	.959	.971	.979	.982	.976	.964	.957	.949	.949	.953	.959	.968	.979	.984	.987	.987	.981	.979	.966
Galveston, Tex.	30.109	.106	.103	.099	.094	.096	.102	.110	.126	.135	.139	.141	.131	.114	.092	.078	.071	.071	.072	.076	.084	.095	.100	.101	.102
Havre, Mont.	27.304	.306	.310	.314	.318	.313	.315	.315	.317	.319	.322	.321	.322	.314	.304	.294	.286	.281	.279	.281	.285	.288	.292	.294	.304
Kansas City, Mo.	29.116	.115	.105	.109	.108	.110	.112	.114	.124	.130	.135	.134	.127	.109	.091	.085	.078	.072	.068	.081	.085	.092	.092	.093	.105
Key West, Fla.	30.126	.118	.106	.102	.102	.106	.120	.136	.149	.159	.156	.145	.122	.101	.088	.080	.082	.088	.098	.111	.122	.129	.132	.130	.117
Memphis, Tenn.	29.746	.744	.742	.740	.738	.740	.748	.754	.767	.776	.779	.780	.770	.752	.732	.726	.719	.716	.720	.726	.729	.733	.737	.736	.744
New Orleans, La.	30.124	.122	.118	.115	.114	.119	.128	.137	.152	.154	.161	.155	.136	.109	.091	.080	.079	.080	.086	.098	.107	.111	.116	.115	.117
New York, N. Y.	29.715	.715	.711	.710	.714	.718	.730	.741	.746	.745	.742	.732	.716	.707	.704	.706	.712	.720	.730	.738	.743	.745	.744	.742	.726
Philadelphia, Pa.	29.966	.966	.964	.967	.970	.975	.986	.994	.998	.995	.990	.979	.960	.947	.941	.939	.947	.955	.968	.974	.981	.983	.981	.981	.971
Pittsburg, Pa.	29.215	.209	.209	.203	.201	.203	.207	.211	.215	.217	.220	.215	.198	.181	.173	.170	.172	.179	.194	.206	.211	.216	.218	.216	.202
Portland, Oreg.	29.843	.844	.845	.843	.844	.844	.838	.836	.828	.829	.832	.840	.846	.851	.849	.840	.832	.831	.834	.835	.835	.840	.844	.847	.840
St. Louis, Mo.	29.519	.515	.516	.511	.512	.519	.525	.532	.545	.548	.549	.548	.531	.512	.499	.493	.492	.493	.501	.503	.505	.506	.506	.502	.516
St. Paul, Minn.	29.152	.158	.161	.161	.157	.156	.156	.153	.156	.162	.163	.164	.156	.138	.124	.113	.111	.110	.114	.119	.121	.120	.120	.118	.140
Salt Lake City, Utah	25.764	.768	.763	.764	.763	.758	.759	.761	.764	.771	.776	.781	.782	.781	.764	.751	.746	.745	.740	.742	.748	.752	.754	.756	.760
San Diego, Cal.	30.008	.006	.008	.008	.002	.994	.988	.985	.992	.997	.011	.022	.022	.016	.001	.979	.966	.961	.959	.959	.967	.975	.981	.988	.991
San Francisco, Cal.	29.974	.977	.982	.978	.977	.974	.971	.972	.976	.980	.994	.999	.004	.005	.994	.976	.963	.958	.952	.949	.954	.959	.966	.971	.975
Savannah, Ga.	30.087	.082	.081	.080	.081	.091	.100	.109	.118	.120	.114	.102	.077	.055	.041	.036	.037	.042	.054	.063	.070	.079	.083	.084	.079
Washington, D. C.	30.012	.016	.014	.014	.016	.024	.030	.040	.045	.046	.043	.022	.998	.981	.976	.973	.979	.988	.998	.006	.014	.017	.020	.021	.012

TABLE VI.—*Average wind movement for each hour of seventy-fifth meridian time, February, 1898.*

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Abilene, Tex.	8.0	8.0	7.5	7.4	7.8	8.5	9.4	9.2	8.9	9.7	11.2	12.6	13.7	12.4	12.4	12.9	12.6	11.6	11.0	8.7	7.1	8.0	8.2	8.1	9.8
Albany, N. Y.	6.5	6.7	7.2	6.9	7.5	7.9	7.8	8.0	8.8	9.2	9.8	9.9	11.4	10.4	10.3	10.1	9.5	8.5	7.8	8.3	7.5	6.6	6.4	6.0	8.3
Alpena, Mich.	9.1	9.0	8.9	9.5	9.8	9.7	9.4	10.0	10.6	12.1	13.1	12.9	13.1	12.9	12.2	12.9	12.5	11.5	11.2	10.0	9.8	9.4	9.2	8.9	10.7
Amarillo, Tex.	16.0	16.9	16.8	15.4	16.1	16.3	16.1	15.8	15.1	15.4	16.3	18.5	19.3	19.6	19.6	19.0	18.6	18.2	15.6	12.7	13.1	14.5	16.8	15.9	16.6
Atlanta, Ga.	10.1	10.3	9.5	9.4	9.7	9.1	8.9	8.9	9.0	10.0	10.9	11.1	11.4	11.3	11.6	12.0	11.7	11.0	9.5	10.0	10.7	10.1	10.0	9.7	10.2
Atlantic City, N. J.	10.3	10.6	11.0	11.3	11.8	11.2	11.1	11.1	12.1	12.9	13.1	12.0	12.3	12.2	11.9	11.4	11.3	9.5	8.8	9.2	9.4	8.9	9.4	9.5	10.9
Augusta, Ga.	5.3	4.7	4.6	4.5	4.5	4.6	5.0	4.7	5.0	5.7	6.6	8.0	9.0	9.2	9.3	9.9	9.0	8.7	7.5	6.8	6.5	5.6	5.5	5.4	6.5
Baker City, Oreg.	5.0	5.9	6.1	5.8	5.9	6.0	4.9	4.7	5.0	5.0	5.9	5.8	5.5	6.9	8.6	8.7	8.6	9.2	8.3	6.6	6.6	5.7	5.8	5.7	6.3
Baltimore, Md.	5.0	4.8	4.8	4.6	4.3	4.6	5.0	4.9	5.8	6.2	6.4	6.3	7.1	6.9	6.9	6.6	6.4	5.6	5.0	5.0	4.5	4.7	4.6	4.6	5.5
Bismarck, N. Dak.	10.8	10.2	9.4	9.1	9.1	8.5	8.7	8.8	9.7	9.2	9.4	10.4	11.6	12.2	12.7	13.0	13.3	13.0	11.6	11.1	11.3	11.5	11.4	11.4	10.7
Block Island, R. I.	15.4	15.7	15.2	15.9	15.7	13.9	13.5	13.5	13.9	14.8	15.5	15.5	15.9	15.9	15.6	15.4	15.4	14.1	14.3	15.2	14.2	14.5	14.6	14.0	14.9
Boston, Mass.	10.3	11.4	11.3	11.1	11.1	11.3	11.5	11.2	11.9	11.6	11.9	12.0	13.2	12.9	12.6	12.9	13.0	11.6	11.9	11.2	10.8	10.5	9.8	9.3	11.5
Buffalo, N. Y.	15.0	14.6	14.4	14.6	14.9	14.5	14.2	14.8	15.5	15.9	16.6	16.4	16.9	17.0	16.9	16.6	16.5	15.5	15.6	15.9	15.8	13.8	14.0	13.6	15.4
Cairo, Ill.	8.6	8.9	9.1	9.1	9.2	9.2	8.7	8.9	9.1	10.7	11.9	12.3	12.5	12.3	12.0	12.0	11.3	10.8	9.4	8.8	8.5	8.5	8.4	8.1	9.9
Cape Henry, Va.	12.6	12.8	12.3	12.2	13.0	13.2	12.6	12.9	13.2	12.9	12.9	12.2	12.6	12.8	11.1	10.4	9.7	9.5	9.6	10.8	11.5	13.1	12.5	12.5	12.0
Carson City, Nev.	6.7	7.0	5.6	4.8	4.9	4.9	4.9	6.0	6.0	5.6	6.0	6.0	6.1	5.5	6.1	7.5	8.8	8.7	7.8	9.0	8.2	8.1	6.8	6.3	6.6
Charleston, S. C.	9.8	9.4	9.6	9.7	9.5	9.5	10.2	9.7	10.4	10.1	10.1	10.2	11.3	12.0	12.4	13.1	12.9	10.6	9.2	8.2	7.8	8.4	8.7	8.9	10.1
Charlotte, N. C.	5.2	5.2	5.7	5.3	4.9	5.1	4.5	5.1	5.8	6.8	7.1	7.3	8.0	8.7	8.6	9.2	8.2	7.3	6.1	5.9	5.8	5.8	5.6	5.5	6.4
Chattanooga, Tenn.	7.2	7.2	6.2	6.1	6.3	6.1	5.8	5.8	6.0	6.4	7.2	7.5	8.9	9.5	9.9	10.4	10.1	9.1	7.7	7.4	7.2	7.0	7.8	7.4	7.5
Cheyenne, Wyo.	9.9	10.1	10.8	11.2	11.0	11.4	10.7	11.4	11.5	11.1	13.1	16.6	18.2	17.2	17.2	16.9	16.8	16.0	13.8	11.7	9.4	9.4	9.0	10.4	12.7
Chicago, Ill.	18.9	18.6	18.9	18.9	18.4	18.7	19.4	19.5	19.6	19.6	20.0	20.2	21.1	19.9	20.6	21.0	20.5	19.2	19.0	19.1	19.0	18.6	18.5	18.3	19.4
Cincinnati, Ohio.	8.4	8.4	8.2	8.2	8.1	8.5	8.2	8.2	9.4	10.2	10.8	10.7	11.7	11.2	11.1	10.8	10.7	9.4	8.7	7.9	8.0	7.6	7.5	7.4	9.1
Cleveland, Ohio	16.5	15.9	15.1	15.2	15.4	15.2	15.0	16.0	16.2	16.2	15.8	16.3	17.0	17.0	17.5	17.5	17.3	17.5	17.3	17.0	16.3	15.9	16.0	15.5	16.3
Columbia, Mo.	10.2	10.6	10.1	10.7	10.6	11.2	11.0	11.1	10.5	11.8	11.9	11.5	12.6	13.1	13.5	13.2	12.2	11.0	9.8	8.8	9.4	9.8	9.7	10.1	11.0
Columbus, Ohio	7.6	7.9	7.6	7.5	7.8	7.4	7.5	7.4	8.1	8.5	9.5	9.8	9.9	10.6	11.0	10.3	9.5	8.9	8.7	8.5	8.1	7.9	7.6	7.9	8.6
Concordia, Kans.	6.4	6.5	5.9	6.6	6.7	5.8	5.9	5.8	5.8	6.9	7.5	8.1	8.3	8.2	8.5	8.9	8.9	8.1	6.6	5.8	5.8	6.5	6.6	6.5	6.9
Corpus Christi, Tex.	9.6	10.0	9.2	10.0	9.8	9.0	9.4	9.6	9.4	9.4	10.8	11.4	12.0	13.2	13.2	14.1	14.7	14.8	14.3	13.4	12.0	11.2	10.2	9.6	11.3
Davenport, Iowa.	7.6	7.5	7.4	7.4	7.1	7.6	8.0	8.0	8.9	9.5	9.9	9.8	10.3	10.9	11.2	10.8	10.3	9.5	8.5	7.5	7.3	7.1	7.8	7.5	8.6
Denver, Colo	7.5	6.9	7.2	8.2	8.1	7.8	7.2	7.1	6.7	7.2	7.7	6.8	8.0	8.2	8.4	8.1	8.1	8.2	7.5	8.0	7.7	6.8	7.2	8.2	7.6
Des Moines, Iowa	8.4	8.3	8.5	8.7	8.5	8.1	8.5	8.4	8.8	9.7	10.2	10.0	10.9	10.5	10.7	10.2	10.9	10.9	9.9	8.4	8.3	8.8	8.6	8.5	9.3
Detroit, Mich.	10.8	10.8	10.3	10.6	10.2	10.4	10.0	10.4	10.7	10.9	12.3	12.6	13.0	12.9	12.6	12.4	11.4	11.2	9.8	9.2	9.8	10.1	10.1	10.5	11.0
Dodge City, Kans.	8.6	8.5	8.4	7.2	8.2	8.3	8.0	7.9	8.4	9.4	11.0	11.5	11.6	12.7	13.0	12.9	11.7	11.8	9.9	8.2	7.9	8.4	8.6	8.8	9.6
Dubuque, Iowa.	8.0	8.0	8.2	8.7	8.5	8.4	8.0	7.9	8.0	9.6	9.1	9.2	9.9	9.5	10.0	10.0	9.6	8.7	8.3	7.3	7.0	6.8	7.1	7.6	8.5
Duluth, Minn.	9.8	10.9	10.0	9.8	10.2	10.9	10.8	11.1	10.9	11.2	11.6	11.4	11.1	11.2	11.6	11.5	11.4	10.9	9.7	9.4	10.1	11.1	9.6	9.0	10.6
Eastport, Me.	15.1	15.2	15.4	15.6	15.0	15.1	15.5	16.2	16.2	16.5	16.5	16.5	14.7	14.5	14.0	14.1	13.8	13.6	13.1	12.2	12.0	12.1	12.6	12.9	14.5
El Paso, Tex.	9.3	8.9	8.8	7.7	8.5	8.9	9.0	8.1	8.4	9.3	9.6	10.4	12.0	11.7	12.1	12.8	12.9	13.2	13.1	11.0	9.0	9.0	9.5	9.6	10.1
Erie Pa.	12.6	11.5	11.9	12.0	11.1	11.5	10.9	11.3	11.9	11.8	11.5	11.3	12.2	12.5	12.9	12.1	11.6	11.8	11.0	12.1	12.7	12.3	12.4	12.0	11.9
Eureka, Cal.	6.3	6.1	5.7	6.0	6.5	6.4	7.1	6.9	6.7	6.5	6.3	5.5	6.5	7.2	7.9	8.1	8.8	8.5	7.8	6.8	5.8	5.6	6.2	6.6	6.7
Fort Canby, Wash.	21.0	22.5	21.3	22.0	24.8	24.2	25.0	24.8	22.4	21.3	20.9	21.9	22.5	23.1	23.6	22.9	23.8	22.4	22.3	21.4	21.6	20.9	21.7	20.6	22.5
Fort Smith, Ark.	6.2	6.4	6.2	6.4	7.2	6.9	7.3	6.7	6.9	7.7	8.5	8.2	8.9	9.4	9.9	10.0	9.7	8.9	7.6	7.1	7.0	6.2	6.7	5.9	7.6
Fresno, Cal.	4.5	4.2	4.6	4.1	4.2	4.5	4.1	4.1	4.4	4.3	4.2	4.6	5.4	6.2	6.8	6.5	6.1	6.1	6.1	6.0	4.4	3.9	3.5	4.1	4.9
Galveston, Tex.	10.2	10.4	10.6	9.8	10.3	10.5	10.9	10.4	10.2	11.4	11.9	11.7	11.9	11.4	11.4	11.0	10.8	10.4	9.6	10.0	10.4	10.6	10.9	10.5	10.7
Grand Haven, Mich.	11.7	11.5	11.1	11.2	12.0	11.6	11.9	11.3	11.6	11.8	12.8	13.0	13.4	12.4	12.1	12.0	11.0	10.8	11.0	11.1	11.4	11.2	11.6	11.0	11.7
Greenbay, Wis.	9.0	9.6	9.6	10.0	10.2	10.1	9.6	9.4	9.3	10.1	10.1	9.6	10.5	10.2	10.2	9.9	9.6	9.1	8.7	8.6	8.9	9.0	9.0	9.0	9.5
Hannibal, Mo.	9.9	10.4	10.3	10.6	10.8	11.0	10.9	10.2	10.1	11.5	12.6	12.7	13.4	13.4	13.6	13.3	13.2	11.9	10.8	9.9	9.4	9.8	9.2	9.2	11.2
Harrisburg, Pa.	8.9	8.6	9.0	8.4	8.0	7.9	7.6	7.9	8.4	9.2	9.5	9.5	10.0	11.1	11.0	9.7	9.6	8.9	8.4	7.8	7.4	7.5	8.2	7.9	8.8
Hatteras, N. C.	15.5	16.8	16.6	16.0	16.2	15.8	15.8	15.9	14.9	14.2	14.0	13.5	13.5	14.4	15.0	15.2	13.9	13.1	14.4	14.6	14.4	14.4	14.7	14.9	14.9
Havre, Mont.	10.0	9.8	9.6	10.6	10.9	10.3	9.8	10.0	9.9	9.7	9.6	9.8	10.4	11.6	13.1	13.2	12.6	12.4	11.2	10.9	9.9	10.2	10.2	10.6	10.7
Helena, Mont.	10.1	9.7	9.2	7.6	7.5	7.4	7.5	6.9	6.0	6.9	6.8	7.1	8.6	9.5	11.5	11.8	11.5	11.0	10.4	9.3	9.4	10.9	12.8	11.2	9.2
Huron, S. Dak.	11.1	10.9	13.4	13.5	12.5	11.7	11.3	11.2	11.5	11.9	13.6	15.0	15.5	16.0	16.0	16.1	15.3	13.8	12.2	11.8	12.1	11.9	11.7	11.5	13.0
Idaho Falls, Idaho	9.7	10.9	11.6	11.5	10.6	10.2	10.5	9.9	9.6	9.1	9.4	9.6	9.9	10.4	11.2	10.5	10.7	10.6	10.7	9.6	9.4	9.5	8.9	9.1	10.1
Indianapolis, Ind.	11.9	10.8	10.9	10.5	11.8	11.6	12.0	12.4	12.2	12.5	13.5	13.7	13.5	13.4	13.5	13.4	13.4	12.5	12.1	11.2	11.4	10.6	11.0	11.0	12.1
Jacksonville, Fla.	6.0	5.4	5.5	6.0	5.6	5.2	5.5	5.4	5.9	6.9	7.8	9.3	9.7	9.8	10.7	11.0	10.1	8.7	7.0	6.5	6.0	6.2	6.0	5.5	7.2
Jupiter, Fla.	8.7	8.7	8.7	8.9	9.0	8.8	8.6	8.6	9.6	10.8	11.6	12.3	12.7	14.5	13.9	13.1	12.6	11.5	9.2	8.7	8.6	9.1	9.2	9.2	10.3
Kansas City, Mo.	9.7	9.3	9.5	9.6	9.4	9.1	8.6	8.2	8.9	9.1	9.5	10.2	11.4	10.4	10.5	10.2	10.0	9.2	8.5	7.6	7.7	7.9	9.2	9.5	9.3
Keokuk, Iowa.	9.0	8.8	8.4	9.0	9.4	9.1	8.6	8.2	8.5	9.5	10.0	10.2	10.4	10.2	11.1	10.5	10.6	9.6	8.7	8.5	8.5	8.5	8.3	8.4	9.3
Key West, Fla.	10.9	11.6	11.6	11.6	11.6	11.8	12.1	12.7	12.3	12.9	12.6	12.1	12.6	12.8	12.9	13.1	13.0	13.1	12.4	12.8	13.0	12.8	12.8	11.8	12.4
Kittyhawk, N. C.	14.0	14.5	14.0	14.0	14.0	14.3	15.1	15.2	15.6	14.5	14.0	14.1	15.5	16.4	15.8	15.5	14.7	13.6	12.9	13.4	12.6	12.8	13.1	14.5	14.3
Knoxville, Tenn.	6.9	6.8	6.6	7.1	7.2	7.2	7.7	7.2	7.0	8.2	8.7	9.3	10.3	10.4	10.3	10.6	10.5	9.0	8.3	7.6	6.2	6.6	6.7	6.1	8.0
La Crosse, Wis.	6.9	7.6	7.8	7.3	6.9	6.9	7.4	7.4	6.8	7.4	7.2	7.7	8.9	8.4	8.3	8.5	8.5	8.1	7.4	7.1	7.4	7.9	8.1	8.0	7.7
Lander, Wyo.	3.9	3.9	2.9	3.1	3.1	3.1	3.4	3.6	3.7	3.9	3.5	3.2	4.3	5.7	6.1	5.9	5.4	4.9	4.8	4.9	4.9	4.7	4.1	4.0	4.2
Lexington Ky.	12.0	11.7	11.7	11.4	11.3	11.8	12.2	12.1	12.6	13.5	14.7	14.9	15.1	14.7	14.2	14.8	13.8	12.6	11.2	11.5	11.3	11.7	11.9	11.0	12.7
Little Rock, Ark.	6.0	5.8	5.1	5.5	5.0	5.2	6.4	7.5	7.3	8.3	9.2	9.6	11.0	9.9	10.4	10.8	11.1	10.0	8.2	7.1	6.1	6.0	6.3	5.9	7.7
Los Angeles, Cal.	2.0	2.2	2.1	2.7	2.5	2.5	2.7	3.0	3.3	3.0	3.1	3.4	3.8	3.9	4.6	5.2	6.8	7.6	7.7	6.6	5.2	3.5	2.6	2.2	3.9
Louisville, Ky.	8.3	8.1	7.9	7.7	8.4	8.8	8.8	9.1	9.7	10.4	11.0	10.6	12.1	12.3	11.7	11.7	11.4	10.2	9.9	9.8	9.3	9.0	8.6	8.5	9.7
Lynchburg, Va.	4.4	4.6	4.1	3.5	3.3	3.6	3.4	3.0	3.7	4.6	5.5	6.0	6.6	6.4	6.3	6.4	6.8	6.1	5.4	4.5	3.8	3.1	3.6	4.4	4.7
Marquette, Mich.	12.5	13.1	13.7	13.2	12.8	13.0	12.9	12.9	12.2	11.8	11.3	11.6	11.6	11.3	10.7	10.1	9.5	8.7	7.4	7.9	9.0	10.2	11.4	12.2	11.3
Memphis, Tenn.	11.0	10.5	10.1	9.7	10.0	10.5	10.8	10.8	11.2	11.8	13.0	12.8	13.4	13.2	13.0	12.7	12.8	11.2	10.4	10.0	10.2	10.5	10.7	10.8	11.3
Milwaukee, Wis.	11.2	10.9	11.7	11.8	11.6	11.8	11.9	11.6	11.0	11.8	12.6	12.3	12.5	12.2	12.7	12.4	12.2	12.0	12.0	10.4	10.5	10.6	10.1	10.5	11.6
Mobile, Ala.	5.1	4.3	4.6	4.5	5.3	5.7	6.2	5.8	5.9	7.5	8.0	8.6	9.6	10.6	10.6	10.4	9.8	9.1	7.2	7.0	6.9	6.6	6.2	5.6	7.1
Montgomery, Ala.	5.5	5.1	5.1	5.5	5.9	5.4	5.2	5.2	6.3	6.8	7.5	7.2	8.0	8.2	8.0	8.5	9.1	8.5	7.9	7.2	7.1	6.6	6.3	5.7	6.7
Moorhead, Minn.	9.4	9.1	9.1	9.5	10.4	10.1	10.8	10.5	9.8	10.4	12.2	12.5	13.8	13.8	14.2	15.1	15.1	14.0	12.3	10.9	10.7	11.2	11.1	10.1	12.0
Nantucket, Mass.	12.0	11.2	10.8	10.2	9 9	9.9	10.9	10.8	10.7	12.3	12.2	12.8	13.2	13.1	12.8	12.7	12.2	10.6	10.5	10.5	10.1	10.9	10.7	10.7	11.3
Nashville, Tenn.	6.8	6.8	6.7	5.9	5.9	5.6	5.6	6.0	6.7	7.0	8.5	10.0	11.4	11.3	11.5	11.6	10.8	10.5	8.9	7.6	6.8	6.6	6.9	7.0	8.0
New Haven, Conn.	7.8	8.1	8.6	8.7	8.5	8.6	9.2	9.5	10.0	10.6	11.8	12.0	13.2	12.5	11.9	11.4	10.6	8.7	8.8	9.1	8.1	8.1	7.6	7.1	9.6
New Orleans, La.	8.4	8.1	7.9	8.1	8.4	8.3	7.5	7.6	8.9	10.0	10.4	10.7	10.6	10.2	10.6	10.5	10.1	9.9	9.0	7.6	7.9	8.2	8.4	8.1	9.0
New York, N. Y.	11.8	12.4	12.3	12.2	12.8	12.6	12.4	12.6	12.1	12.7	12.7	13.2	13.0	12.9	13.6	13.6	14.2	13.6	14.1	13.3	12.5	12.3	11.2	11.3	12.7
Norfolk, Va.	8.0	7.7	6.9	7.4	7.0	6.6	7.0	7.0	7.9	8.7	9.0	9.4	9.9	9.4	9.8	9.3	8.9	7.6	7.2	8.1	6.8	7.5	7.5	7.7	8.0
Northfield, Vt.	6.9	6.9	6.6	7.9	8.6	7.9	7.6	8.0	8.5	9.1	11.0	12.0	12.6	12.3	12.6	11.4	10.1	8.5	8.3	7.8	7.3	6.5	6.0	6.1	8.8
North Platte, Nebr.	8.8	8.2	8.1	7.6	7.6	7.8	8.2	8.0	6.9	7.2	8.5	9.8	10.6	12.2	12.5	12.6	12.4	12.6	10.1	7.6	7.3	8.0	8.5	9.1	9.2
Oklahoma, Okla.	9.5	10.1	10.7	10.8	10.0	9.4	10.2	10.1	10.8	11.4	13.4	14.3	14.8	15.0	15.0	14.6	14.4	14.0	11.3	9.5	8.9	9.2	9.4	9.4	11.5
Omaha, Nebr.	7.2	7.3	6.9	7.0	7.9	7.4	7.5	7.4	7.5	8.0	8.9	9.1	9.4	9.5	9.5	9.8	10.5	9.4	8.4	7.3	7.2	7.6	7.6	7.6	8.2
Oswego, N. Y.	12.3	12.6	12.3	12.8	12.5	11.8	11.8	12.1	11.9	11.6	12.1	11.9	13.0	12.5	11.9	11.2	10.8	11.0	11.7	11.2	11.3	12.1	12.7	12.1	12.0
Palestine, Tex.	5.7	5.7	6.2	6.0	6.3	6.2	6.4	5.8	6.0	6.8	8.1	8.6	9.0	9.3	9.4	9.6	9.6	8.8	7.6	6.1	5.6	5.8	6.0	6.3	7.1
Parkersburg, W. Va.	5.6	5.4	5.2	5.0	5.1	5.6	5.9	5.6	5.4	6.6	6.9	7.6	7.7	7.6	7.8	8.2	7.6	6.7	6.1	5.5	5.1	4.4	4.2	4.6	6.1

TABLE VI.—*Average wind movement, etc.*—Continued.

Stations.	1 a. m.	2 a. m.	3 a. m.	4 a. m.	5 a. m.	6 a. m.	7 a. m.	8 a. m.	9 a. m.	10 a. m.	11 a. m.	Noon.	1 p. m.	2 p. m.	3 p. m.	4 p. m.	5 p. m.	6 p. m.	7 p. m.	8 p. m.	9 p. m.	10 p. m.	11 p. m.	Midnight.	Mean.
Pensacola, Fla.	8.0	7.4	7.1	7.4	7.2	7.5	7.7	8.1	8.0	9.4	10.7	10.6	10.9	12.4	12.1	12.0	11.4	10.5	8.9	7.6	7.2	7.6	7.8	8.1	9.0
Philadelphia, Pa.	9.9	10.2	9.8	9.5	9.3	9.3	9.4	10.3	10.6	11.3	11.3	10.5	10.9	10.9	11.5	11.4	11.1	10.5	10.5	10.4	10.5	9.8	9.4	8.9	10.3
Phœnix, Ariz	2.0	2.8	3.0	2.8	2.9	3.0	3.0	3.4	3.6	3.4	3.3	3.5	4.2	4.5	4.1	4.1	4.4	4.4	4.4	3.4	2.5	2.3	2.2	2.2	3.3
Pierre, S. Dak.	9.0	8.5	8.6	7.9	8.4	8.0	8.2	7.8	8.0	7.1	9.1	9.9	10.3	10.2	11.0	11.6	11.8	12.0	11.5	10.3	10.1	8.6	8.5	8.9	9.4
Pittsburg, Pa.	6.7	5.9	6.2	6.2	5.8	5.7	6.1	6.8	6.8	7.3	7.8	8.6	8.5	8.6	8.5	8.2	8.0	8.2	7.4	7.4	6.9	7.2	7.2	6.8	7.2
Port Angeles, Wash.	5.8	5.6	5.5	5.8	5.5	5.5	4.7	4.8	4.9	5.2	5.6	5.0	4.6	5.4	5.6	6.1	6.5	6.2	5.6	5.3	5.0	5.1	5.9	5.4	5.4
Port Huron, Mich.	13.0	13.0	12.4	12.0	12.0	12.1	11.8	11.9	12.3	13.3	14.2	14.3	15.1	15.9	16.0	15.4	14.6	13.5	12.7	12.1	12.0	12.1	12.1	11.9	13.1
Portland, Me.	8.9	8.4	7.9	7.9	7.8	7.9	8.2	8.3	7.8	7.8	7.6	8.0	8.1	8.3	8.8	9.1	8.5	8.2	8.0	8.0	8.2	8.4	8.1	8.0	8.2
Portland, Oreg.	9.9	9.8	9.6	9.5	9.3	8.9	9.2	10.2	10.4	12.0	11.4	11.1	11.8	12.0	12.8	13.0	13.0	12.9	11.5	10.8	9.7	9.6	10.3	11.0	10.8
Pueblo, Colo.	7.0	6.9	6.5	6.3	6.9	7.0	7.5	7.0	6.5	6.5	6.6	7.4	8.0	9.0	9.3	8.9	9.8	9.6	9.6	7.2	6.2	5.5	5.7	5.7	7.4
Raleigh, N. C.	4.7	4.5	4.3	4.0	4.2	4.1	4.4	4.3	4.6	5.7	6.1	6.2	7.4	7.1	7.2	6.9	6.5	5.6	4.8	5.3	4.9	4.8	4.3	4.6	5.3
Rapid City, S. Dak.	9.8	8.9	7.8	7.5	7.4	7.1	6.9	6.0	6.0	6.9	7.3	8.0	10.6	11.9	13.1	13.5	13.3	12.5	11.0	10.4	8.5	7.9	7.6	8.6	9.1
Redbluff, Cal.	5.5	5.5	5.2	5.6	5.7	5.5	5.3	5.4	5.9	6.0	6.5	6.3	6.9	7.4	7.7	8.2	8.6	8.5	8.2	7.4	5.9	6.0	6.0	5.6	6.4
Richmond, Va.	4.6	4.4	4.0	4.2	4.2	4.2	4.6	4.6	5.2	5.9	6.6	6.9	7.1	7.8	7.2	7.0	6.5	6.0	5.5	5.2	5.6	5.1	4.8	4.8	5.5
Rochester, N. Y.	7.6	7.5	7.5	7.6	7.4	7.5	7.7	7.6	7.9	8.8	9.4	9.5	10.0	9.5	8.4	8.2	8.1	8.2	8.4	8.4	8.7	8.5	8.0	7.6	8.3
Roseburg, Oreg.	2.7	2.4	2.8	2.1	2.8	3.0	2.4	2.4	2.9	3.3	2.9	2.9	3.2	4.0	5.2	5.4	5.6	5.2	5.0	4.4	4.1	3.4	2.9	2.4	3.5
Sacramento, Cal.	6.9	7.1	7.9	8.0	7.5	6.9	7.5	8.2	7.6	7.2	7.2	6.8	7.9	8.4	9.1	9.5	9.8	9.7	9.4	7.8	6.9	7.2	7.3	7.1	7.9
St. Louis, Mo.	10.6	10.8	11.0	10.9	10.9	10.9	11.0	11.5	12.7	12.5	12.7	13.2	12.9	13.5	13.7	13.9	13.9	12.8	10.9	11.0	11.3	10.4	9.9	9.4	11.8
St. Paul, Minn.	7.6	8.2	7.6	7.3	7.4	6.9	6.9	7.4	7.4	8.0	8.2	9.0	9.1	9.6	9.6	10.0	9.6	9.4	8.0	7.4	7.4	7.5	7.8	7.7	8.1
Salt Lake City, Utah.	4.1	4.4	3.9	3.9	3.9	3.6	3.3	3.5	4.2	4.4	4.8	5.1	5.8	6.5	7.7	8.0	8.1	7.9	7.1	6.0	4.8	4.3	4.2	4.0	5.1
San Antonio, Tex.	8.4	8.3	8.0	7.0	6.3	7.1	7.9	7.5	7.7	8.0	9.6	10.1	10.6	10.3	10.5	10.5	10.1	10.5	10.6	9.0	9.2	9.5	8.9	7.9	8.9
San Diego, Cal.	3.0	3.1	2.7	3.9	3.8	3.6	3.3	3.8	3.8	3.7	3.6	3.5	4.9	6.6	8.7	10.2	11.5	11.7	11.0	8.5	6.9	4.6	3.9	3.1	5.6
Sandusky, Ohio	9.6	8.6	8.6	8.6	8.2	8.2	8.3	8.5	8.6	9.8	10.4	11.3	12.0	11.6	11.7	11.9	10.7	10.0	9.5	9.3	8.8	8.5	9.1	9.0	9.6
San Francisco, Cal.	7.6	7.6	6.8	6.9	7.0	6.6	6.8	7.6	7.2	6.9	6.8	6.7	7.3	7.3	8.1	8.6	10.2	11.8	12.5	13.0	11.4	9.9	8.4	7.1	8.3
San Luis Obispo, Cal.	3.9	3.9	3.8	4.1	4.2	3.6	3.7	4.0	5.0	4.5	4.5	5.0	6.0	7.9	8.6	9.1	9.3	9.7	9.6	8.2	6.5	5.1	4.5	4.0	5.8
Santa Fe, N. Mex.	3.8	3.7	4.2	4.3	4.2	4.1	3.8	3.5	3.7	3.4	5.2	7.4	8.5	8.2	8.8	8.4	8.5	8.1	7.3	5.3	3.4	3.0	3.9	3.8	5.4
Sault Ste Marie, Mich.	8.1	8.5	8.2	8.5	8.4	8.8	9.0	8.5	9.1	9.8	10.3	10.8	11.5	12.3	12.6	12.2	12.6	11.5	9.6	9.6	8.4	8.6	7.5	7.9	9.7
Savannah, Ga.	8.2	8.2	8.7	8.0	7.8	7.6	7.9	7.6	7.9	8.5	9.0	9.6	10.7	10.4	11.1	10.6	9.9	8.7	7.9	7.3	7.1	7.2	7.6	7.3	8.5
Seattle, Wash.	8.2	7.8	8.2	7.9	7.1	6.8	6.7	6.2	6.7	7.0	7.4	7.2	8.0	8.5	9.0	8.9	9.1	9.3	8.8	8.9	9.0	7.9	7.7	7.9	7.9
Shreveport, La.	7.1	6.4	6.5	6.9	6.6	5.9	5.6	5.9	6.0	7.4	8.1	8.4	8.2	8.3	9.1	9.0	9.1	8.5	7.8	6.1	6.3	6.8	7.3	7.1	7.3
Sioux City, Iowa.	12.1	12.3	13.0	13.3	12.6	12.8	14.3	14.7	14.2	14.2	15.0	15.4	16.7	16.6	16.3	16.4	16.6	15.8	14.5	13.4	13.2	13.0	12.2	11.7	14.2
Spokane, Wash.	8.2	8.0	7.6	7.4	7.2	7.5	6.7	7.2	7.0	7.4	8.4	8.4	8.9	9.4	10.1	10.8	10.3	10.0	9.2	8.3	8.4	7.8	8.1	7.6	8.3
Springfield, Ill.	10.9	11.0	11.0	10.8	10.9	11.0	11.5	11.1	11.8	12.6	13.4	13.6	13.8	14.1	13.8	13.6	13.2	12.6	11.3	10.9	11.0	10.5	10.9	10.5	11.9
Springfield, Mo.	12.2	11.9	12.3	12.2	12.0	12.8	12.1	12.6	13.4	13.5	13.5	13.5	14.4	14.5	14.5	14.8	14.3	13.6	11.4	9.9	10.4	11.4	11.4	12.0	12.7
Tacoma, Wash.	7.5	7.1	8.1	7.6	7.0	6.2	6.4	6.0	5.9	5.8	6.6	6.1	7.3	8.5	9.7	10.5	9.4	9.2	9.0	8.9	8.0	7.7	8.0	7.3	7.6
Tampa, Fla.	5.8	4.9	5.0	5.4	5.4	5.2	5.6	5.5	6.1	6.9	7.7	7.9	9.0	9.1	8.8	8.8	9.6	8.5	6.9	6.2	5.7	5.9	5.6	5.6	6.7
Tatoosh Island, Wash.	15.4	15.9	16.3	17.1	17.2	18.6	18.1	20.8	20.9	20.9	20.8	20.3	21.4	23.1	22.4	21.2	21.1	20.8	18.5	18.6	17.4	17.4	16.6	15.7	19.0
Toledo, Ohio	10.0	10.1	10.3	9.9	9.6	9.8	9.4	9.2	10.3	10.9	11.9	12.4	13.5	13.0	13.2	12.4	11.7	11.0	10.7	10.3	9.9	9.9	10.2	10.1	10.8
Vicksburg, Miss.	8.0	7.9	6.8	6.9	6.7	6.6	7.0	7.0	7.5	7.9	8.2	8.5	8.8	8.3	8.2	8.1	7.6	6.8	6.7	6.1	6.5	7.2	7.7	7.8	7.5
Vineyard Haven, Mass	9.2	8.0	7.4	8.1	8.3	8.3	8.0	7.7	8.7	9.7	10.4	11.1	11.7	11.2	10.9	10.2	9.2	8.3	7.9	8.3	8.0	8.0	7.9	8.4	9.0
Walla Walla, Wash.	7.6	7.8	7.3	6.9	7.6	7.6	8.1	7.9	8.0	7.9	8.3	8.3	9.1	10.7	10.4	10.9	9.9	9.4	8.3	7.4	7.9	8.1	7.9	7.7	8.4
Washington, D. C.	8.0	7.3	6.5	6.1	5.9	5.9	5.5	6.0	7.8	8.5	7.7	8.4	8.9	9.5	9.1	9.2	9.2	8.2	7.3	6.8	7.2	7.2	6.5	7.0	7.5
Wichita, Kans.	8.9	8.9	8.4	8.6	8.8	9.6	9.3	9.0	8.9	9.3	10.6	11.3	11.6	11.4	11.0	10.6	9.9	9.9	8.6	7.2	7.1	8.5	8.6	9.0	9.4
Williston, N. Dak.	8.7	8.1	7.8	7.2	7.1	6.5	6.4	6.5	6.7	6.3	6.4	7.7	9.4	10.0	12.1	13.4	13.3	11.9	10.5	8.5	8.6	8.6	8.9	9.2	8.7
Wilmington, N. C.	6.8	7.0	6.9	7.0	6.7	6.4	7.1	7.5	8.0	9.0	9.0	8.6	9.2	9.8	10.3	10.2	9.7	8.4	6.9	6.6	6.5	6.6	6.7	6.1	7.8
Woods Hole, Mass.	13.6	13.2	12.4	13.8	15.2	14.5	14.6	13.5	13.5	13.5	13.1	13.2	13.9	14.3	14.6	14.4	13.8	12.8	12.6	13.6	14.0	13.8	13.4	13.2	13.7
Yankton, S. Dak.	9.2	9.2	8.7	8.3	8.6	8.7	9.6	9.5	9.2	9.4	10.5	11.6	11.8	11.9	12.0	11.9	11.5	10.8	9.8	8.2	8.0	8.1	8.1	8.5	9.7

TABLE VII.—*Resultant winds from observations at 8 a. m. and 8 p. m., daily, during the month of February, 1898.*

Stations.	Component direction from—				Resultant.	
	N.	S.	E.	W.	Direction from—	Duration.
New England.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	°	*Hours.*
Eastport, Me	21	16	15	18	n. 31 w.	6
Portland, Me	23	14	8	22	n. 57 w.	17
Northfield, Vt	23	27	4	6	s. 27 w.	4
Boston, Mass	16	19	9	25	s. 79 w.	16
Nantucket, Mass	18	19	8	22	s. 86 w.	14
Woods Hole, Mass.*	4	13	8	11	s. 18 w.	10
Block Island, R. I	18	15	10	26	n. 79 w.	16
New Haven, Conn	29	12	9	16	n. 22 w.	18
Middle Atlantic States.						
Albany, N. Y	15	20	4	22	s. 74 w.	19
Binghamton, N. Y.†	8	7	10	8	n. 6 e.	2
New York, N. Y	18	14	14	24	n. 68 w.	11
Harrisburg, Pa	22	5	14	24	n. 30 w.	20
Philadelphia, Pa	27	13	11	23	n. 41 w.	18
Atlantic City, N. J	21	13	13	24	n. 54 w.	14
Cape May, N. J	20	11	10	25	n. 59 w.	18
Baltimore, Md	20	8	15	25	n. 40 w.	16
Washington, D. C	28	11	10	18	n. 25 w.	19
Lynchburg, Va	15	14	15	24	n. 84 w.	9
Norfolk, Va	21	14	17	16	n. 8 e.	7
Richmond, Va	10	9	5	9	n. 76 w.	4
South Atlantic States.						
Charlotte, N. C	21	16	27	10	n. 74 e.	18
Hatteras, N. C	31	8	9	16	n. 17 w.	24
Raleigh, N. C	27	9	7	21	n. 21 w.	19
Wilmington, N. C	18	14	14	17	n. 37 w.	5
Charleston, S. C	23	9	15	19	n. 16 w.	15
Augusta, Ga	23	2	5	32	n. 52 w.	34
Savannah, Ga	23	12	10	19	n. 39 w.	14
Jacksonville, Fla	22	11	14	22	n. 36 w.	14
Florida Peninsula.						
Jupiter, Fla	21	10	11	26	n. 54 w.	19
Key West, Fla	24	6	26	1	n. 54 e.	31
Tampa, Fla	30	5	11	21	n. 22 w.	27
Eastern Gulf States.						
Atlanta, Ga	18	8	20	17	n. 17 e.	10
Pensacola, Fla	22	14	20	14	n. 37 e.	10
Mobile, Ala	24	18	14	13	n. 9 e.	6
Montgomery, Ala	19	12	22	16	n. 41 e.	9
Vicksburg, Miss	20	23	15	11	s. 53 e.	5
New Orleans, La	20	16	18	13	n. 51 e.	6
Western Gulf States.						
Shreveport, La	17	18	24	13	s. 58 e.	43
Fort Smith, Ark	16	7	23	16	n. 38 e.	11
Little Rock, Ark	15	13	16	23	n. 74 w.	7
Corpus Christi, Tex	18	17	30	2	n. 88 e.	28
Galveston, Tex	17	24	23	4	s. 70 e.	20
Palestine, Tex	21	24	12	11	s. 18 e.	3
San Antonio, Tex	27	17	24	3	n. 65 e.	23
Ohio Valley and Tennessee.						
Chattanooga, Tenn	20	13	16	23	n. 45 w.	10
Knoxville, Tenn	19	19	10	22	w.	12
Memphis, Tenn	18	17	22	13	n. 84 e.	9
Nashville, Tenn	20	21	13	18	s. 79 w.	5
Lexington, Ky	7	25	15	22	s. 21 w.	19
Louisville, Ky	10	25	12	21	s. 31 w.	18
Evansville, Ind	6	8	5	12	s. 74 w.	3
Indianapolis, Ind	14	23	6	23	s. 62 w.	19
Cincinnati, Ohio	12	22	17	20	s. 17 w.	10
Columbus, Ohio	8	20	14	23	s. 37 w.	15
Pittsburg, Pa	6	23	12	21	s. 28 e.	19
Parkersburg, W. Va	17	20	21	17	s. 53 e.	5
Lower Lake Region.						
Buffalo, N. Y	9	23	11	25	s. 45 w.	20
Oswego, N. Y	13	26	19	13	s. 25 e.	14
Rochester, N. Y	12	22	11	28	s. 60 w.	20
Erie, Pa	12	27	6	22	s. 47 w.	22
Cleveland, Ohio	10	28	15	19	s. 13 w.	18
Sandusky, Ohio	12	22	4	30	s. 69 w.	28
Toledo, Ohio	14	23	7	25	s. 63 w.	20
Detroit, Mich	15	23	8	23	s. 62 w.	17
Upper Lake Region.						
Alpena, Mich	17	19	12	22	s. 79 w.	10
Grand Haven, Mich	18	20	20	15	s. 68 e.	5
Marquette, Mich	21	16	9	19	n. 63 w.	11
Port Huron, Mich	14	27	11	19	s. 32 w.	15
Sault Ste. Marie, Mich	18	12	21	18	n. 27 e.	7
Chicago, Ill	17	18	9	21	s. 85 w.	12

Stations.	Component direction from—				Resultant.	
	N.	S.	E.	W.	Direction from—	Duration.
Upper Lake Region—Cont'd.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	°	*Hours.*
Milwaukee, Wis	20	16	9	22	n. 73 w.	14
Greenbay, Wis	20	19	6	20	n. 86 w.	14
Duluth, Minn	26	14	11	21	n. 40 w.	16
North Dakota.						
Moorhead, Minn	21	16	16	21	n. 45 w.	7
Bismarck, N. Dak	22	8	18	21	n. 37 w.	5
Williston, N. Dak	21	17	7	22	n. 75 w.	16
Upper Mississippi Valley.						
St. Paul, Minn	22	18	13	19	n. 56 w.	7
La Crosse, Wis.†	12	8	4	10	n. 56 w.	7
Davenport, Iowa	16	18	10	27	s. 83 w.	17
Des Moines, Iowa	24	15	11	17	n. 34 w.	11
Dubuque, Iowa	27	19	8	24	n. 53 w.	20
Keokuk, Iowa	17	21	12	24	s. 72 w.	13
Cairo, Ill	20	21	12	15	s. 72 w.	3
Springfield, Ill	18	20	6	23	s. 83 w.	17
Hannibal, Mo.†	11	7	5	10	n. 51 w.	6
St. Louis, Mo	16	20	13	20	s. 60 w.	8
Missouri Valley.						
Columbia, Mo.*	8	9	6	11	s. 79 w.	5
Kansas City, Mo	21	16	10	19	n. 61 w.	10
Springfield, Mo	21	21	16	16	0	0
Lincoln, Nebr	25	16	13	14	n. 6 w.	9
Omaha, Nebr	27	17	7	19	n. 50 w.	16
Sioux City, Iowa†	14	6	8	10	n. 14 w.	8
Pierre, S. Dak	22	17	21	16	n. 45 e.	7
Huron, S. Dak	23	18	16	14	n. 22 e.	5
Yankton, S. Dak†	10	3	7	15	n. 49 w.	11
Northern Slope.						
Havre, Mont	17	11	13	29	n. 69 w.	17
Miles City, Mont	19	25	10	15	s. 40 w.	8
Helena, Mont	10	29	4	32	s. 56 w.	34
Rapid City, S. Dak	15	15	11	28	w.	17
Cheyenne, Wyo	22	8	3	27	n. 60 w.	28
Lander, Wyo	12	25	14	21	s. 28 w.	15
North Platte, Nebr	22	14	6	29	n. 71 w.	24
Middle Slope.						
Denver, Colo	16	21	15	18	s. 31 w.	6
Pueblo, Colo	21	9	15	20	n. 23 w.	13
Concordia, Kans	22	22	9	15	w.	6
Dodge City, Kans	19	20	12	15	s. 72 w.	3
Wichita, Kans	25	18	10	12	n. 16 w.	7
Oklahoma, Okla	26	20	8	11	n. 27 w.	7
Southern Slope.						
Abilene, Tex	21	25	6	16	s. 68 w.	11
Amarillo, Tex	20	21	4	15	s. 85 w.	11
Southern Plateau.						
El Paso, Tex	21	6	17	25	n. 58 w.	9
Santa Fe, N. Mex	25	11	18	12	n. 23 e.	15
Phœnix, Ariz	18	4	15	23	n. 30 w.	16
Yuma, Ariz	25	8	18	13	n. 16 e.	18
Middle Plateau.						
Carson City, Nev	14	14	16	25	w.	9
Winnemucca, Nev	12	16	17	18	s. 14 w.	1
Salt Lake City, Utah	16	16	20	18	e.	2
Northern Plateau.						
Baker City, Oreg	7	33	20	9	s. 23 e.	28
Idaho Falls, Idaho	20	26	4	10	s. 45 w.	8
Spokane, Wash	3	29	20	9	s. 22 e.	29
Walla Walla, Wash	5	13	5	14	s. 48 w.	12
North Pacific Coast Region.						
Fort Canby, Wash	2	26	25	10	s. 47 w.	20
Port Angeles, Wash.*	7	3	11	14	n. 37 w.	5
Seattle, Wash	6	39	18	7	s. 18 e.	35
Tacoma, Wash	7	22	7	23	s. 47 w.	22
Tatoosh Island, Wash	6	23	20	15	s. 16 e.	18
Portland, Oreg	9	23	17	8	s. 33 e.	17
Roseburg, Oreg	6	29	17	16	s. 2 w.	23
Middle Pacific Coast Region.						
Eureka, Cal	16	23	21	11	s. 55 e.	12
Redbluff, Cal	27	15	9	18	n. 37 w.	15
Sacramento, Cal	19	26	14	10	s. 30 w.	8
San Francisco, Cal	12	18	7	29	s. 75 w.	23
South Pacific Coast Region.						
Fresno, Cal	21	10	15	24	n. 39 w.	14
Los Angeles, Cal	16	9	13	26	n. 62 w.	15
San Diego, Cal	28	8	14	21	n. 19 w.	21
San Luis Obispo, Cal	25	16	3	15	n. 53 w.	15

*From observations at 8 p. m. only. †From observations at 8 a. m. only.

TABLE VIII.—*Thunderstorms and auroras, February*, 1898.

States.	No. of stations.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total. No.	Total. Days.	
Alabama	55	T.											4						5		7				1			3	3					23	6	T.
		A.																																0	0	A.
Arizona	56	T.								1																								1	1	T.
		A.																																0	0	A.
Arkansas	59	T.								1		5								2	9						5	10						32	6	T.
		A.																																0	0	A.
California	180	T.					1		7													1				1		4						14	5	T.
		A.																																0	0	A.
Colorado	72	T.																																0	0	T.
		A.								1																								1	1	A.
Connecticut	21	T.																				1	1											2	2	T.
		A.																																0	0	A.
Delaware	5	T.																																0	0	T.
		A.																																0	0	A.
Dist. of Columbia	4	T.																																0	0	T.
		A.																																0	0	A.
Florida	45	T.															1			5	7	1												14	4	T.
		A.																																0	0	A.
Georgia	55	T.		1				1												1	1	3						2						9	6	T.
		A.																																0	0	A.
Idaho	38	T.	1											1																				2	2	T.
		A.																																0	0	A.
Illinois	86	T.													1						1													2	2	T.
		A.														1		1	1			1												4	4	A.
Indiana	57	T.								1											5													6	2	T.
		A.																																0	0	A.
Indian Territory	7	T.									2									1														3	2	T.
		A.																																0	0	A.
Iowa	120	T.									2					1																		3	2	T.
		A.																										1						1	1	A.
Kansas	85	T.								2	13	1				2																		18	4	T.
		A.																	1															1	1	A.
Kentucky	48	T.											1	1						1	11	4												18	5	T.
		A.																																0	0	A.
Louisiana	46	T.				1						5	7			1		1	10		12				1		4	5	11					58	11	T.
		A.																																0	0	A.
Maine	18	T.																																0	0	T.
		A.													1																			1	1	A.
Maryland	40	T.															2					1												3	2	T.
		A.																																0	0	A.
Massachusetts	59	T.															10	1				1	1											13	4	T.
		A.																																0	0	A.
Michigan	104	T.															1					1												2	2	T.
		A.																																0	0	A.
Minnesota	67	T.											3	1	1	1	1		5	1		3		1			1		1					18	10	T.
		A.					1					6	2						3		7						1	10	5					35	8	A.
Mississippi	43	T.																																0	0	T.
		A.						1		1	27	1	1		1	3			1		3						4	7					50	11	A.
Missouri	93	T.																																0	0	T.
		A.																																0	0	A.
Montana	40	T.																																0	0	T.
		A.	1			1				1	1	1	1	1	1	1	2	2	2	1	1			1										18	15	A.
Nebraska	144	T.									9	2			1	3	1																	16	5	T.
		A.											2				1																	3	2	A.
Nevada	50	T.																																0	0	T.
		A.															1	1		1														3	3	A.
New Hampshire	21	T.																																0	0	T.
		A.													3																			3	3	A.
New Jersey	51	T.																				9												9	1	T.
		A.													1																			1	1	A.
New Mexico	34	T.								2																								2	2	T.
		A.																																0	0	A.
New York	113	T.											1									1	1											3	2	T.
		A.													1							1												2	2	A.
North Carolina	57	T.																				13												13	3	T.
		A.																																0	0	A.
North Dakota	52	T.																																0	0	T.
		A.										4	7		1	1	1		5			1												20	10	A.
Ohio	134	T.											2	1							9	16	1	1	1			1	1					31	7	T.
		A.						1		1									1		1	1												7	2	A.
Oklahoma	21	T.								2	9																							11	2	T.
		A.																																0	0	A.
Oregon	72	T.															1																	1	1	T.
		A.																																0	0	A.
Pennsylvania	105	T.														3						6	4											13	3	T.
		A.	1																			1	1											3	2	A.
Rhode Island	8	T.																					2											4	2	T.
		A.																																0	0	A.
South Carolina	40	T.																	1									3						4	2	T.
		A.																																0	0	A.
South Dakota	56	T.																																0	0	T.
		A.							1		1			1	1										1										5	3	A.
Tennessee	59	T.																		3	6						3							12	3	T.
		A.																																0	0	A.
Texas	89	T.								1	12	9					1	1	5	2			1	2	1		5	4	1					45	13	T.
		A.																																0	0	A.
Utah	38	T.																																0	0	T.
		A.																																0	0	A.
Vermont	14	T.																																0	0	T.
		A.																																0	0	A.
Virginia	48	T.																				9	1											10	2	T.
		A.																																0	0	A.
Washington	50	T.					1	2																										3	2	T.
		A.																																0	0	A.
West Virginia	33	T.											1			1	3				1	5												11	5	T.
		A.																																0	0	A.
Wisconsin	60	T.																																0	0	T.
		A.													2																			2	1	A.
Wyoming	17	T.																																0	0	T.
		A.																																0	0	A.
Sums	3871	T.	1	1	0	1	3	4	7	11	74	29	19	3	3	11	20	4	21	15	38	77	11	3	4	2	14	43	32	1	0	0	0	452	....	T.
		A.	2	0	0	1	0	1	1	3	2	5	13	3	12	3	4	5	16	3	3	9	2	1	1	1	0	2	1	1	0	0	0	95	....	A.

TABLE IX.—*Average hourly sunshine (in percentages), February, 1898.*

Stations.	Instrument.	Percentages for each hour of local mean time ending with the respective hour.																Hours of sunshine.			
		A. M.								P. M.								Total.			
		5	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7	8	Actual.	Possible.	Percent of possible.	Personal estimate.
																		Hours.	*Hours.*		
Albany, N. Y	T.	.....	.....	15	14	30	38	58	61	68	65	61	43	30	27	.....	.....	136.6	295.4	46	30
Atlanta, Ga	T.	.....	.....	45	46	48	52	60	60	58	58	55	58	61	59	.....	.....	170.6	307.1	56	57
Atlantic City, N. J	P.	.....	.....	69	70	66	72	75	71	67	64	69	72	69	68	.....	.....	208.5	300.8	69	60
Baltimore, Md	T.	.....	.....	36	33	55	70	81	87	88	82	74	63	48	42	.....	.....	199.0	300.8	66	56
Binghamton, N. Y	T.	.....	.....	3	13	19	39	57	61	61	49	39	32	28	13	.....	.....	113.0	296.5	38	34
Bismarck, N. Dak	P.	.....	.....	94	73	68	72	69	69	68	65	58	55	51	58	.....	.....	186.0	288.7	64	58
Boston, Mass	T.	.....	.....	48	38	45	46	55	61	55	57	55	46	32	26	.....	.....	142.3	296.5	48	41
Buffalo, N. Y	T.	.....	.....	15	5	14	31	50	64	65	54	42	31	9	4	.....	.....	102.8	295.4	35	21
Charleston, S. C	T.	.....	.....	51	57	64	72	79	79	82	78	71	65	61	60	.....	.....	215.1	308.3	70	66
Chattanooga, Tenn	T.	.....	.....	22	29	34	46	47	53	58	59	56	53	50	35	.....	.....	144.0	305.8	47	52
Cheyenne, Wyo	P.	.....	.....	47	65	79	84	79	81	70	69	70	63	57	42	.....	.....	208.1	298.4	70	52
Chicago, Ill	T.	.....	.....	14	23	37	49	50	61	59	55	46	39	28	23	.....	.....	129.0	296.5	44	43
Cincinnati, Ohio	T.	.....	.....	10	28	36	40	48	63	68	53	45	43	39	34	.....	.....	135.1	300.8	45	38
Cleveland, Ohio	T.	.....	.....	0	12	19	26	33	42	37	34	32	25	16	15	.....	.....	79.6	296.5	27	22
Columbus, Ohio	T.	...	.....	8	21	34	48	52	54	55	54	51	48	33	25	.....	.....	130.6	299.7	44	33
Denver, Colo	P.	.....	.....	58	63	72	81	78	73	74	78	74	75	62	82	.....	.....	219.7	299.7	73	54
Des Moines, Iowa	T.	.....	.....	62	62	62	56	59	65	72	69	58	54	52	49	.....	.....	178.9	296.5	60	59
Detroit, Mich	T.	.....	.....	3	7	18	28	38	41	41	48	36	29	21	17	.....	.....	88.4	296.5	30	26
Dodge City, Kans	P.	.....	.....	72	74	82	85	86	85	78	80	82	77	68	56	.....	.....	236.3	302.3	78	65
Dubuque, Iowa	T.	.....	.....	24	22	37	53	59	69	70	69	66	41	28	27	.....	.....	148.4	296.5	50	46
Eastport, Me	P.	.....	.....	24	25	32	42	42	42	40	42	42	35	24	14	.....	.....	104.0	291.9	36	26
Erie, Pa	T.	.....	.....	0	3	14	24	36	46	44	39	30	25	14	15	.....	.....	79.1	296.5	27	19
Eureka, Cal	P.	.....	.....	15	19	33	43	40	41	41	41	39	31	19	9	.....	.....	99.0	298.4	33	21
Fresno, Cal	T.	.....	.....	40	36	45	73	74	78	78	74	79	64	58	64	.....	.....	198.3	303.3	65	60
Galveston, Tex	P.	.....	.....	39	53	68	74	72	76	79	80	78	71	67	60	.....	.....	219.1	313.1	70	62
Harrisburg, Pa	T.	.....	.....	63	48	50	65	74	84	87	84	73	62	53	36	.....	.....	198.7	299.7	66	46
Helena, Mont	P.	.....	.....	44	35	50	72	64	56	59	60	54	40	28	24	.....	.....	147.4	288.7	51	49
Huron, S. Dak	T.	.....	.....	71	44	59	71	76	76	83	85	82	69	40	47	.....	.....	198.7	293.8	68	59
Idaho Falls, Idaho	T.	.....	.....	27	22	46	69	83	90	88	81	78	61	25	14	.....	.....	182.3	295.4	62	42
Indianapolis, Ind	T.	.....	.....	18	11	20	49	48	50	50	44	37	22	20	20	.....	.....	101.9	299.7	34	34
Jacksonville, Fla.*	T.	.....	.....	58	57	75	81	94	97	99	90	86	81	66	68	.....	.....	163.4	203.1	80	65
Kansas City, Mo. †	P.	.....	.....	29	46	52	58	57	58	64	71	54	49	56	56	.....	.....	95.0	168.1	57	54
Key West, Fla	T.	.....	.....	51	55	65	71	78	82	90	85	79	72	70	65	60	.....	231.8	317.0	73	60
Knoxville, Tenn	T.	.....	.....	31	43	43	62	70	68	66	67	64	63	48	42	.....	.....	179.6	305.0	59	56
Little Rock, Ark	T.	.....	.....	54	55	57	61	62	69	70	72	73	73	65	64	.....	.....	200.2	305.8	65	57
Los Angeles, Cal	P.	.....	.....	49	56	55	62	76	76	78	76	80	80	70	71	.....	.....	216.2	307.1	70	56
Louisville, Ky. ‡	T.	.....	.....	11	12	19	30	30	38	40	44	38	32	28	30	.....	.....	79.9	260.9	31	34
Minneapolis, Minn	T.	.....	.....	43	37	39	47	54	55	50	45	47	39	31	36	.....	.....	128.9	291.9	44	.....
Nashville, Tenn	T.	.....	.....	29	40	48	57	63	66	67	58	61	60	56	48	.....	.....	172.1	305.0	56	51
New Orleans, La	T.	.....	.....	51	51	62	72	78	86	83	76	83	80	65	61	.....	.....	224.8	312.1	72	72
New York, N. Y	T.	.....	.....	35	34	45	62	65	71	62	68	68	64	49	35	.....	.....	171.3	298.4	57	46
Northfield, Vt	P.	.....	.....	4	19	30	37	40	40	32	32	33	28	16	15	.....	.....	87.8	293.8	30	28
Oklahoma, Okla	T.	.....	.....	73	64	69	74	78	85	86	86	85	82	67	60	.....	.....	223.3	305.8	76	75
Omaha, Nebr	P.	.....	.....	56	51	58	66	69	68	74	71	73	68	58	57	.....	.....	194.2	298.4	65	53
Parkersburg, W. Va	T.	.....	.....	14	22	22	31	51	52	44	39	34	34	21	20	.....	.....	101.5	300.8	34	26
Philadelphia, Pa	T.	.....	.....	55	55	57	64	70	68	74	70	70	59	60	63	.....	.....	193.4	299.7	65	52
Phœnix, Ariz	P.	.....	.....	88	88	94	96	97	98	95	99	86	80	73	66	.....	.....	271.2	308.3	88	79
Pittsburg, Pa	T.	.....	.....	0	6	8	21	31	43	43	50	39	28	30	25	.....	.....	87.7	298.4	29	25
Portland, Me	T.	.....	.....	4	18	31	35	39	47	50	54	48	44	31	25	.....	.....	114.3	293.8	39	31
Portland, Oreg	T.	.....	.....	0	3	14	31	34	36	45	45	39	21	9	8	.....	.....	78.8	290.4	27	22
Raleigh, N. C	T.	.....	.....	33	42	59	72	79	80	82	77	71	64	53	44	.....	.....	200.1	305.0	66	55
Rochester, N. Y	T.	.....	.....	4	11	12	21	26	26	31	29	19	8	5	7	.....	.....	53.0	295.4	18	18
St. Louis, Mo	T.	.....	.....	31	35	42	51	58	63	62	59	58	54	50	42	.....	.....	157.3	300.8	52	41
St. Paul, Minn	P.	.....	.....	24	31	44	48	56	47	45	47	49	45	35	32	.....	.....	128.7	291.9	44	40
Salt Lake City, Utah	P.	.....	.....	65	59	59	62	69	66	63	69	70	62	44	43	.....	.....	182.8	298.4	61	30
San Diego, Cal	P.	.....	.....	46	51	65	68	76	86	87	85	79	82	75	70	.....	.....	229.6	308.3	74	70
San Francisco, Cal	T.	.....	.....	0	7	28	46	64	76	72	75	76	70	54	18	.....	.....	162.3	302.3	54	48
Santa Fe, N. Mex	P.	.....	.....	59	78	92	91	91	91	89	86	80	81	77	59	.....	.....	254.3	305.0	83	72
Savannah, Ga	P.	.....	.....	55	65	72	78	79	77	72	66	69	68	51	48	.....	.....	210.3	309.8	68	63
Seattle, Wash	T.	.....	.....	0	4	14	26	46	49	52	58	50	34	26	13	.....	.....	102.0	286.8	36	28
Spokane, Wash	T.	.....	.....	0	6	16	40	53	61	66	51	39	29	14	1	.....	.....	105.4	286.8	37	26
Tacoma, Wash	T.	.....	.....	19	7	15	29	43	54	55	51	41	32	16	11	.....	.....	97.3	288.7	34	20
Tampa, Fla	T.	.....	.....	61	65	70	75	80	78	79	81	74	66	68	69	100	.....	228.2	314.1	73	72
Vicksburg, Miss	T.	.....	.....	51	50	66	74	74	83	83	83	81	66	60	45	.....	.....	215.6	309.8	70	65
Washington, D. C	P.	.....	.....	62	53	52	60	66	62	60	64	59	59	57	57	.....	.....	178.2	300.8	59	53
Wilmington, N. C	T.	.....	.....	41	49	71	85	86	88	82	82	78	67	50	30	.....	.....	215.6	307.1	70	66
Yankton, S. Dak	T.	.....	.....	38	33	58	80	82	82	80	76	72	74	54	49	.....	.....	201.4	295.4	68	60

*All values, except personal estimate, for 18 days only. † All values, except personal estimate, for 16 days only. ‡ All values, except personal estimate, for 24 days only.

TABLE X.—*Accumulated amounts of precipitation for each 5 minutes, for storms in which the rate of fall equaled or exceeded* 0.25 *in any* 5 *minutes, or* 0.75 *in* 1 *hour during February,* 1898, *at all stations furnished with self-registering gauges.*

Stations.	Date.	Total duration. From—	Total duration. To—	Total am't of precipitation.	Excessive rate. Began—	Excessive rate. Ended—	Amount before excessive began.	Depths of precipitation (in inches) during periods of time as indicated. 5 min.	10 min.	15 min.	20 min.	25 min.	30 min.	35 min.	40 min.	45 min.	50 min.	60 min.	80 min.	100 min.	120 min.
	1	2	3	4	5	6	7														
Albany, N. Y.																					
Atlanta, Ga.	17-18			0.33														0.13			
Atlantic City, N. J.	19-20			1.49														0.45			
Baltimore, Md	20-21			0.27														0.13			
Binghamton, N. Y.	20-21			0.61														0.10			
Bismarck, N. Dak.*																					
Boston, Mass.	20-22			3.17														0.24			
Buffalo, N. Y.	11-12			0.61														0.16			
Cairo, Ill.	17			0.46														0.16			
Charleston, S. C.	27			0.36														0.12			
Chicago, Ill.	11			0.36														0.13			
Cincinnati, Ohio	11			0.99														0.75			
Cleveland, Ohio	20-21			0.91														0.17			
Columbia, Mo	9			0.95														0.46			
Columbus, Ohio	11			0.47														0.24			
Denver, Colo.*																					
Des Moines, Iowa	9-10			0.46														0.15			
Detroit, Mich.	19-20			0.42														0.18			
Dodge City, Kans.*																					
Duluth, Minn.*																					
Eastport, Me.*																					
Erie, Pa.	11-12			0.74														0.22			
Fresno, Cal.	5-6			0.49														0.21			
Galveston, Tex.	10	1.26 p.m.	4.42 p.m.	1.72	3.40 p.m.	4.20 a.m.	0.77	0.08	0.15	0.21	0.42	0.69	0.76	0.86	0.93						
Do	23-24	11.05 p.m.	2.27 a.m.	0.72	1.02 a.m.	1.11 a.m.	0.02	0.14	0.41	0.58											
Harrisburg, Pa.	20-21			0.83														0.21			
Hatteras, N. C.	18-19			0.86														0.13			
Huron, S. Dak.*																					
Idaho Falls, Idaho*																					
Indianapolis, Ind.	19			0.48														0.22			
Jacksonville, Fla.	19-20			0.61								0.40									
Jupiter, Fla	3-4			0.50														0.34			
Kansas City, Mo.†																					
Key West, Fla.	28			0.14					0.10												
Knoxville, Tenn.	20			0.22														0.12			
Lincoln, Nebr.*																					
Little Rock, Ark.	10-11			0.71														0.30			
Los Angeles, Cal.	7			0.23														0.05			
Louisville, Ky.	11			0.61														0.34			
Memphis, Tenn.	26			0.72														0.26			
Milwaukee, Wis.	*																				
Montgomery, Ala.	11			0.60														0.28			
Nantucket, Mass.	19-20			0.89														0.15			
Nashville, Tenn.	11			0.43														0.37			
New Orleans, La.	11	4.50 a.m.	11.00 a.m.	1.26	5.24 a.m.	5.43 a.m.	0.03	0.08	0.28	0.43	0.48	0.53									
New York, N. Y.†																					
Norfolk, Va.	18-19			0.92														0.14			
Northfield, Vt.*																					
Oklahoma, Okla.	9	7.45 a.m.	10.30 p.m.	2.35	6.53 p.m.	7.35 p.m.	1.38	0.10	0.22	0.33	0.44	0.57	0.67	0.73	0.77						
Omaha, Nebr.*																					
Parkersburg, W. Va.	20			0.32														0.08			
Philadelphia, Pa.	18-20			2.46														0.70			
Pittsburg, Pa.	20-21			0.70														0.13			
Portland, Me.*																					
Portland, Oreg.†	20			0.57														0.15			
Raleigh, N. C.	18			0.17														0.05			
Richmond	18-19			0.52														0.10			
Rochester, N. Y.*																					
St. Louis, Mo.	10-11			0.76														0.27			
St. Paul, Minn.	10			0.77														0.20			
Salt Lake City, Utah*																					
San Diego, Cal.†																					
San Francisco, Cal.	24			0.66														0.10			
Savannah, Ga.	27			0.23														0.20			
Seattle, Wash.	6			0.55														0.17			
Spokane, Wash.																					
Tampa, Fla.	18			0.96														0.60			
Vicksburg, Miss.	10-11			1.23														0.51			
Washington, D. C.	15			0.20														0.20			
Wilmington, N. C.	18-19			2.15														0.66			
Yankton, S. Dak.*																					

* Record incomplete on account of snow.

† Self-register out of order.

TABLE XI.—*Excessive precipitation, by stations, for February, 1898.*

Stations.	Monthly rainfall 10 inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Alabama.	*Inches.*	*Inches.*		*Ins.*	*h.m.*	
Alco		3.35	11	....	.....	.....
Mobile		.....	.....	2.00	1 00	11
Arkansas.						
Pocahontas		2.80	26	.....	.....	.....
California.						
Bear Valley	10.44	.....	.....	.....	.....	.....
Bowmans Dam	12.23	.....	.....	.....	.....	.....
Crescent City	13.00	.....	.....	.....	.....	.....
Edmanton	12.74	3.10	24	.....	.....	.....
Fort Ross	12.94	6.50	6-7	.....	.....	.....
Do	.....	2.57	24	.....	.....	.....
Laporte	13.04	.....	.....	.....	.....	.....
Los Gatos	.....	2.80	24	.....	.....	.....
Malakoff Mine	13.03	.....	.....	.....	.....	.....
Quincy	10.08	2.68	7	.....	.....	.....
Redbluff	.....	.....	.....	1.08	0 40	27
Upper Mattole	22.25	4.00	7	.....	.....	.....
Do	.....	2.90	21	.....	.....	.....
Do	.....	4.65	26-27	.....	.....	.....
Connecticut.						
Hartford	.....	2.70	19-20	.....	.....	.....
Windsor	.....	2.74	19-20	.....	.....	.....
Florida.						
Defuniak Springs	.....	2.75	17	.....	.....	.....
Lake Butler	.....	3.98	19	.....	.....	.....
Pensacola	.....	4.25	17-18	.....	.....	.....
Iowa.						
Cedarrapids	.....	2.50	9	.....	.....	.....
Kansas.						
Rome	.....	2.58	9-10	.....	.....	.....
Wichita	.....	3.04	9	1.20	1 00	9
Louisiana.						
Amite	.....	4.30	10-11	.....	.....	.....
Baton Rouge	.....	2.79	10	.....	.....	.....
Elm Hall	.....	3.00	17	.....	.....	.....
Franklin	.....	2.60	17	.....	.....	.....
Houma	.....	2.60	11	.....	.....	.....
Do	.....	3.00	17	.....	.....	.....
Jeanerette	.....	2.88	10	.....	.....	.....
Lawrence	.....	5.76	17	.....	.....	.....
Mansfield	.....	2.85	10	.....	.....	.....
Melville	.....	2.70	10-11	.....	.....	.....
New Orleans	.....	2.78	17	.....	.....	.....
Port Eads	.....	3.70	17	.....	.....	.....
Paincourtville	.....	2.80	17	.....	.....	....
Rayne	.....	2.55	10-11	.....	.....	.....
Shellbeach	.....	2.60	16	.....	.....	.....
Do	.....	2.55	27	.....	.....	.....
Southern University	12.50	6.75	11	....	.....	.....
Do	.....	3.30	17	.....	.....	.....
Sugar Experiment Station	.....	3.35	17	.....	.....	.....
Venice	.....	5.10	17	.....	.....	.....
Wallace	.....	2.97	17	.....	.....	.....
Maine.						
Bar Harbor	.....	2.80	1	.....	.....	.....
Do	.....	4.20	15-16	.....	.....	.....
Belfast	11.35	6.70	21-23	.....	.....	.....
Cumberland Mills	.....	3.00	22	.....	.....	.....
North Bridgton	.....	2.53	20-21	.....	.....	.....
Orono	.....	5.17	22-23	.....	.....	.....
Portland	.....	3.06	21-22	.....	.....	.....
Massachusetts.						
Attleboro	.....	3.96	23	.....	.....	.....
Fallriver	.....	2.99	22	.....	.....	.....
Mansfield	.....	2.98	20-21	.....	.....	.....
New Bedford	.....	2.75	21	.....	.....	.....
Roxbury	.....	2.88	21	.....	.....	.....
Taunton	.....	4.00	20-21	.....	.....	.....
Mississippi.						
Bay St. Louis	.....	2.77	18	.....	.....	.....
Logtown	.....	2.50	17	.....	.....	.....
Magnolia	.....	3.36	10-11	.....	.....	.....
Missouri.						
New Palestine	.....	2.90	9	.....	.....	.....

TABLE XI.—*Excessive precipitation*—Continued.

Stations.	Monthly rainfall 10 inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
New Jersey.	*Inches.*	*Inches.*		*Ins.*	*h.m.*	
Asbury Park	.....	2.89	20	.....	.....	.....
Bayonne	.....	3.11	20	.....	.....	.....
Belvidere	.....	2.58	19-20	.....	.....	.....
Camden	.....	3.04	19-20	.....	.....	.....
Englewood	.....	2.91	20	.....	.....	.....
Friesburg	.....	2.66	19	.....	.....	.....
Oceanic	.....	3.90	20	.....	.....	.....
Toms River	.....	4.06	19-20	.....	.....	.....
New York.						
Lake George	.....	2.97	1	.....	.....	.....
Middletown	.....	3.51	22	.....	.....	.....
New York	.....	2.84	19-20	.....	.....	.....
Setauket	.....	2.62	19-20	.....	.....	.....
Westpoint	.....	2.80	19-20	.....	.....	.....
Oklahoma.						
Anadarko	.....	4.10	9	.....	.....	.....
Arapaho	.....	2.54	9	.....	.....	.....
Edmond	.....	3.25	9	.....	.....	.....
Fort Reno	.....	6.34	9-10	.....	.....	.....
Guthrie	.....	3.30	9	.....	.....	.....
Hennessey	.....	2.95	9	.....	.....	.....
Jefferson	.....	2.55	9	.....	.....	.....
Kingfisher	.....	4.03	9	.....	.....	.....
Mangum	.....	3.38	9-10	.....	.....	.....
Newkirk	.....	3.08	9	.....	.....	.....
Stillwater	.....	3.00	9	.....	.....	.....
Waukomis	.....	3.25	9	.....	.....	.....
Winnview	.....	3.55	9-10	.....	.....	.....
Oregon.						
Astoria	14.61	2.63	4-5	.....	.....	.....
Bay City	29.39	3.85	5	.....	.....	.....
Do	.....	2.50	7	.....	.....	.....
Cascade Locks	14.48	.....	.....	.....	.....	.....
Falls City	12.65	.....	.....	.....	.....	.....
Gardiner	13.25	2.55	20	.....	.....	.....
Glenora	23.86	8.50	5-7	.....	.....	.....
Government Camp	12.94	.....	.....	.....	.....	.....
Langlois	22.12	7.01	16	.....	.....	.....
Do	.....	3.40	20	.....	.....	.....
Newport	13.01	.....	.....	.....	.....	.....
Toledo	10.60	.....	.....	.....	.....	.....
Pennsylvania.						
Browers	.....	2.55	20	.....	.....	.....
Coopersburg	.....	2.51	20	.....	.....	.....
Easton	.....	2.65	20	.....	.....	.....
Forks of Neshaminy	.....	2.68	20	.....	.....	.....
Philadelphia (V. O.)	.....	2.53	19-20	.....	.....	.....
Swiftwater	.....	2.60	20	.....	.....	.....
Rhode Island.						
Bristol	.....	2.75	21	.....	.....	.....
Kingston	.....	6.69	20-21	.....	.....	.....
Narragansett Pier	.....	5.05	20-21	.....	.....	.....
Texas.						
Brenham	.....	4.25	10	.....	.....	.....
College Station	.....	3.82	9-10	.....	.....	.....
Galveston	.....	.....	.....	1.02	1 00	10
Huntsville	.....	2.50	10	.....	.....	.....
Luling	.....	3.90	9-10	.....	.....	.....
Palestine	.....	3.74	9-10	.....	.....	.....
Rheinland	.....	2.57	9	.....	.....	.....
Washington.						
Aberdeen	14.42	.....	.....	.....	.....	.....
Ashford	11.06	.....	.....	.....	.....	.....
Clearwater	25.05	2.67	5	.....	.....	.....
Do	.....	3.05	10	.....	.....	.....
Fort Canby	12.49	.....	.....	.....	.....	.....
Lapush	16.46	.....	.....	.....	.....	.....
Northbend	10.92	.....	.....	.....	.....	.....
Pysht	11.97	.....	.....	.....	.....	.....
Southbend	16.57	2.52	5	.....	.....	.....
Tatoosh Island	17.51	.....	.....	.....	.....	.....
Union City	16.30	3.25	5	.....	.....	.....

Chart I. Tracks of Centers of High Areas. February, 1898.

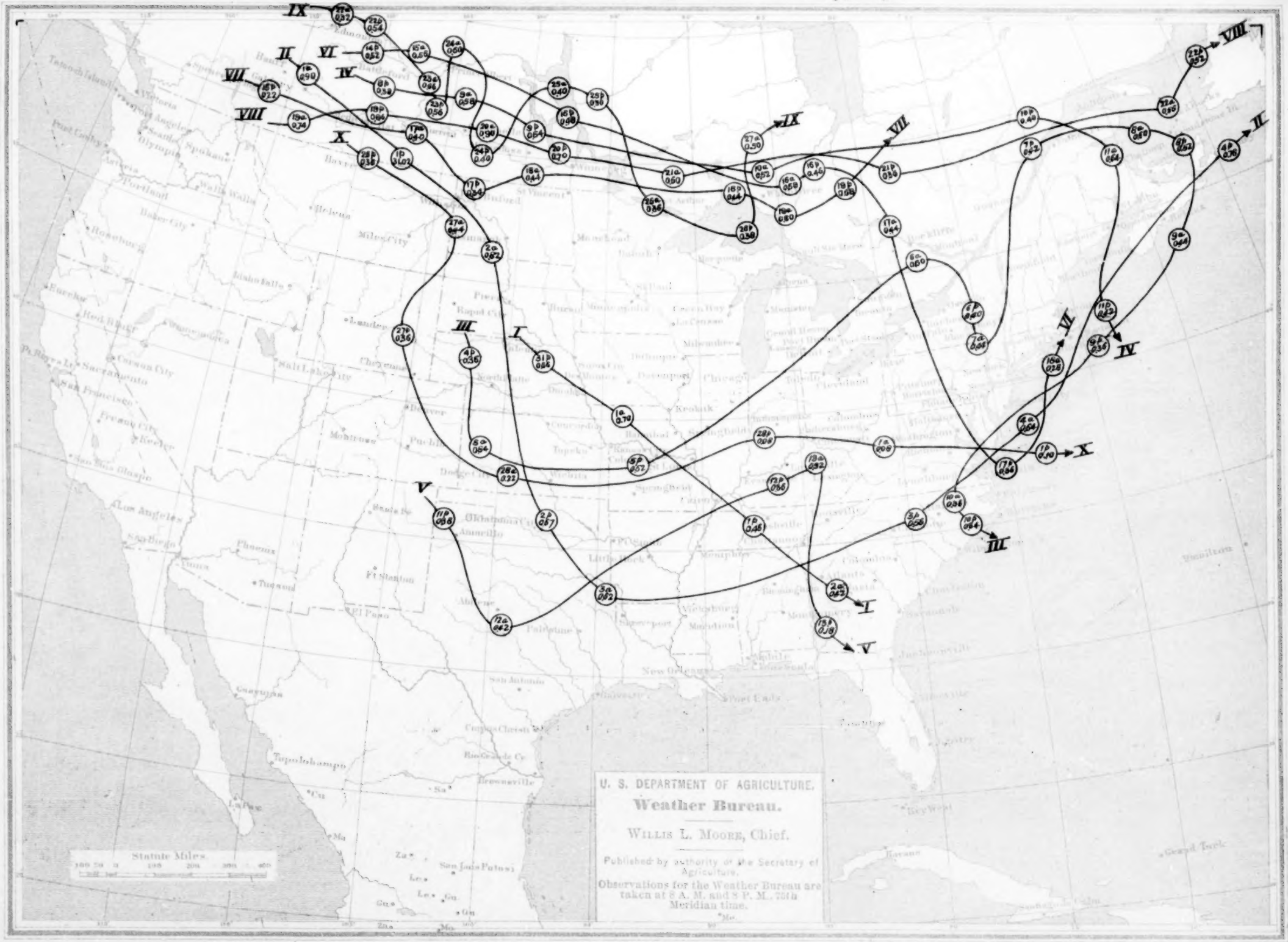
U. S. DEPARTMENT OF AGRICULTURE.
Weather Bureau.
Willis L. Moore, Chief.
Published by authority of the Secretary of Agriculture.
Observations for the Weather Bureau are taken at 8 A. M. and 8 P. M., 75th Meridian time.
Statute Miles.

Chart II. Tracks of Centers of Low Areas. February, 1898.

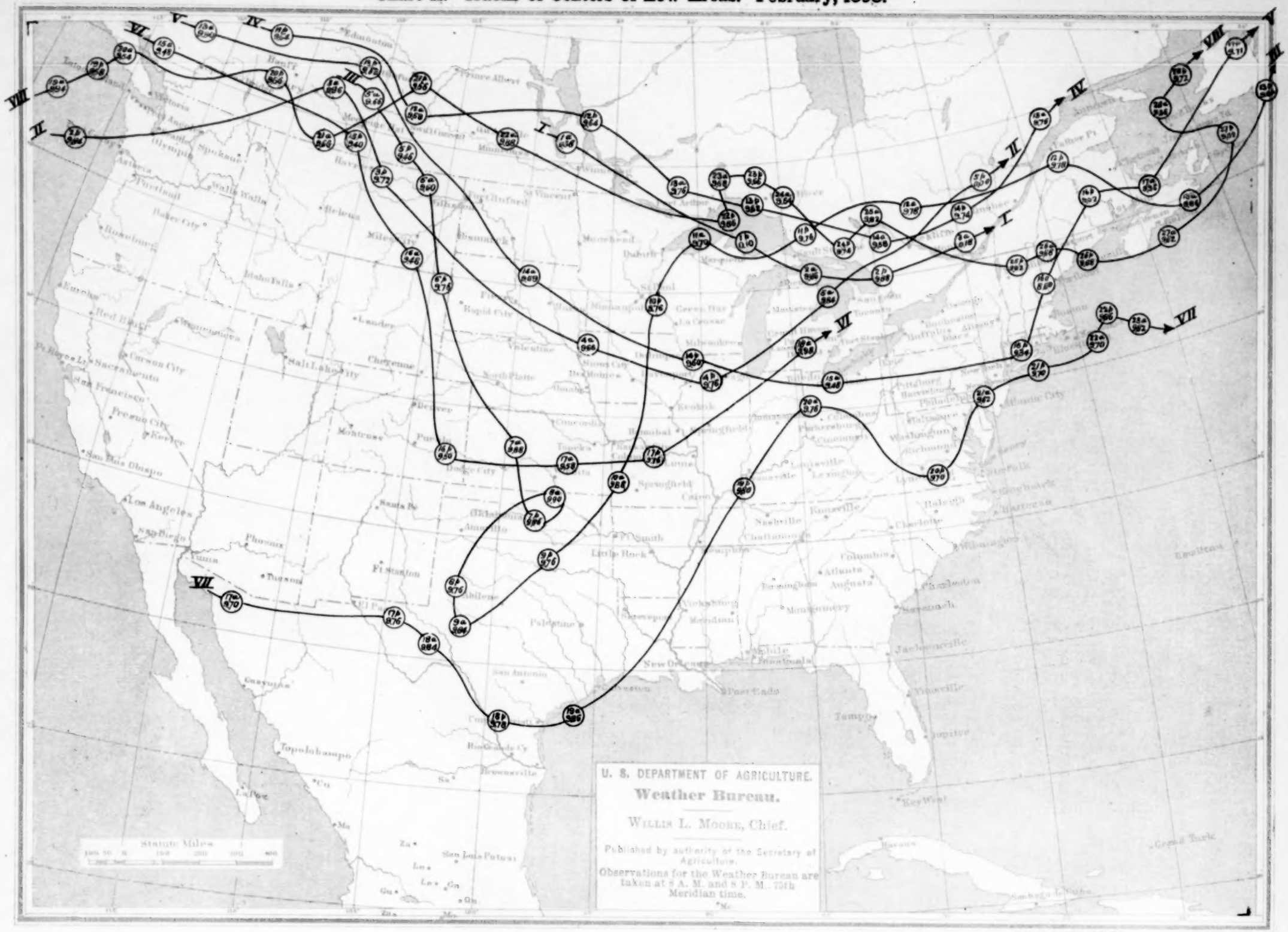

Chart III. Total Precipitation. February, 1898.

Chart III. Total Precipitation. February, 1898.

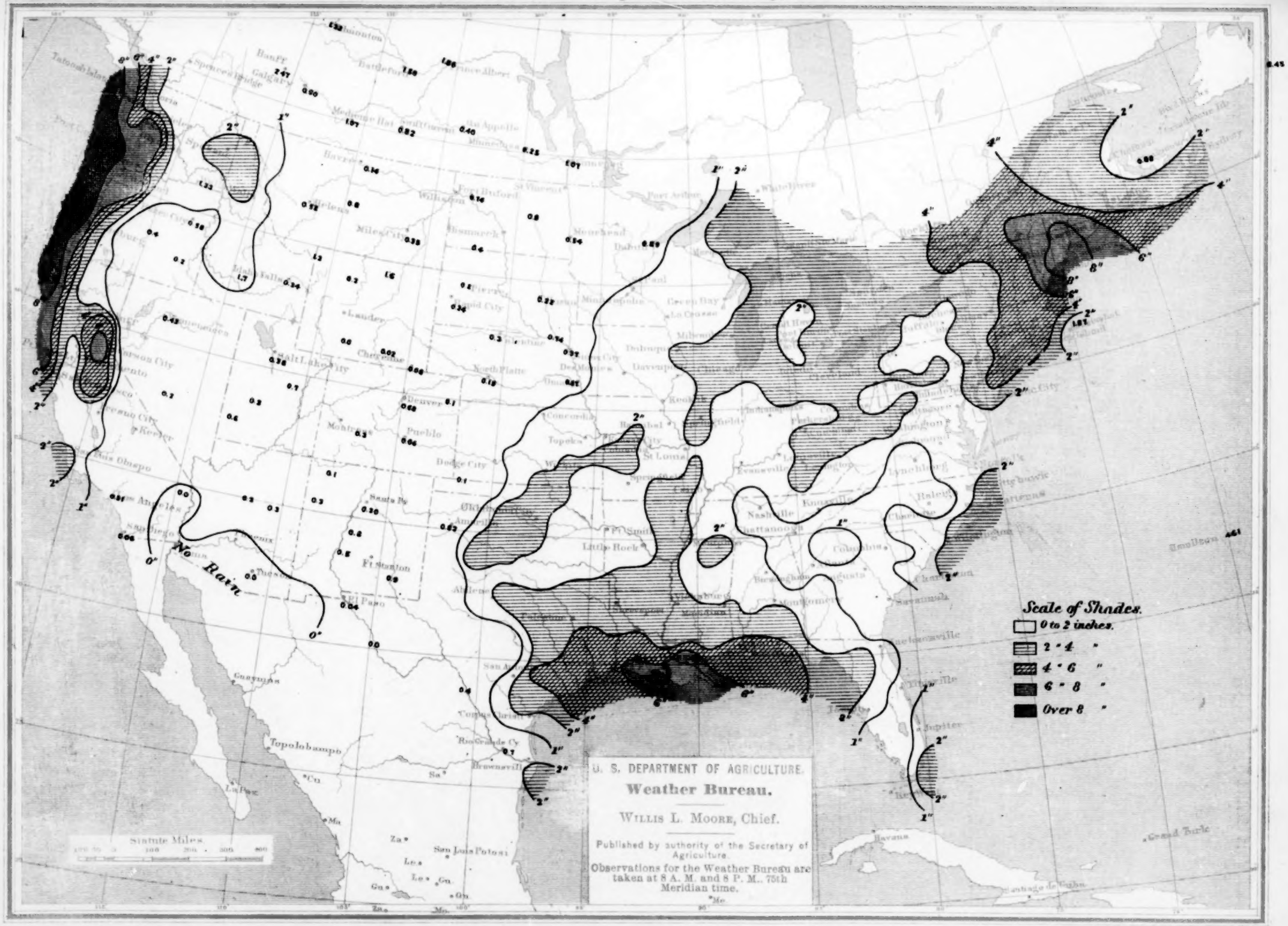
No Rain
Scale of Shades.
0 to 2 inches.
2 " 4 "
4 " 6 "
6 " 8 "
Over 8 "
Statute Miles
U. S. DEPARTMENT OF AGRICULTURE.
Weather Bureau.
WILLIS L. MOORE, Chief.
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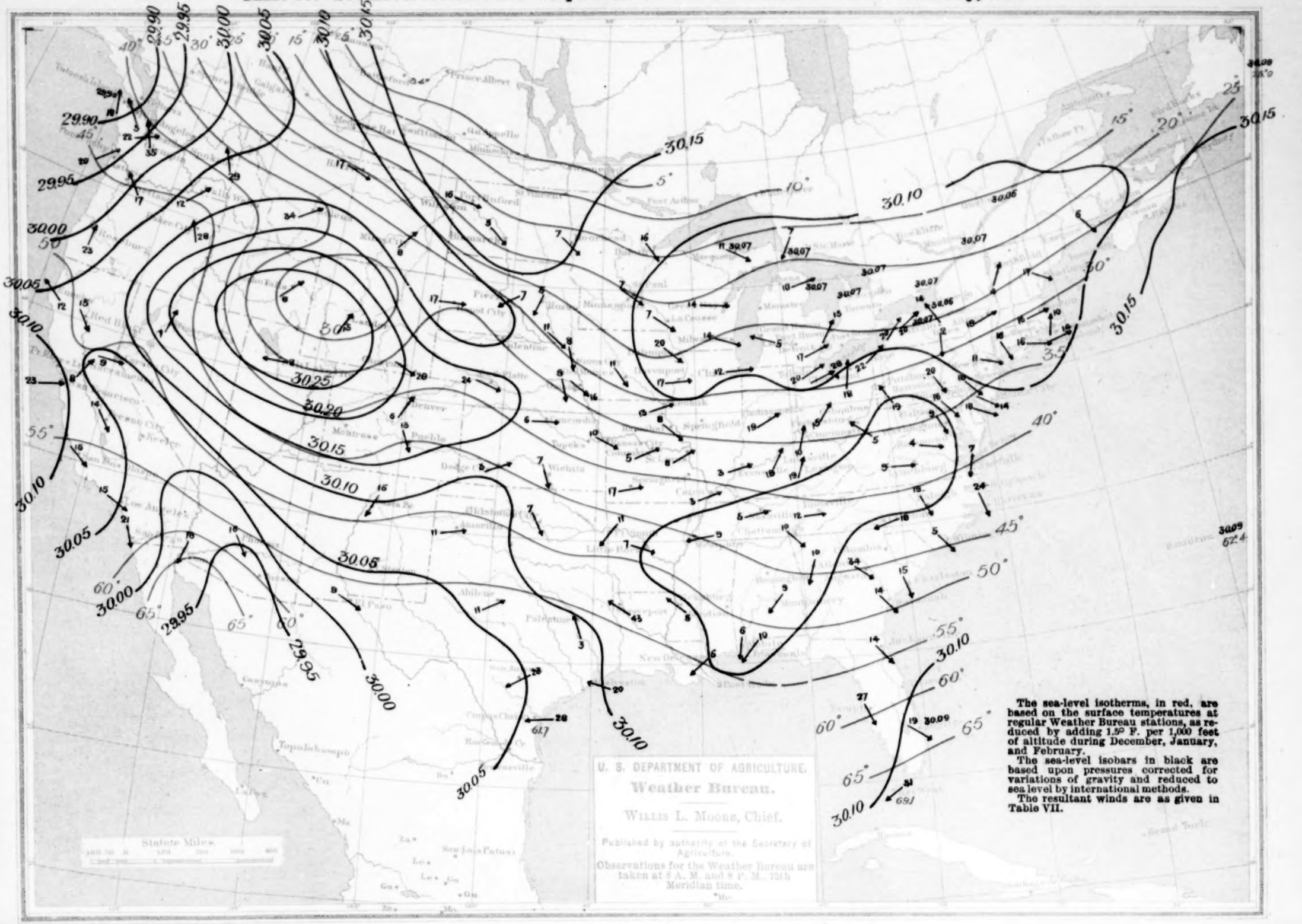
Chart IV. Sea-Level Pressure and Temperature and Resultant Surface Winds. February, 1898.



The sea-level isotherms, in red, are based on the surface temperatures at regular Weather Bureau stations, as reduced by adding 1.5° F. per 1,000 feet of altitude during December, January, and February.

The sea-level isobars in black are based upon pressures corrected for variations of gravity and reduced to sea level by international methods.

The resultant winds are as given in Table VII.

Chart V. Hydrographs for Seven Principal Rivers of the United States. February, 1898.

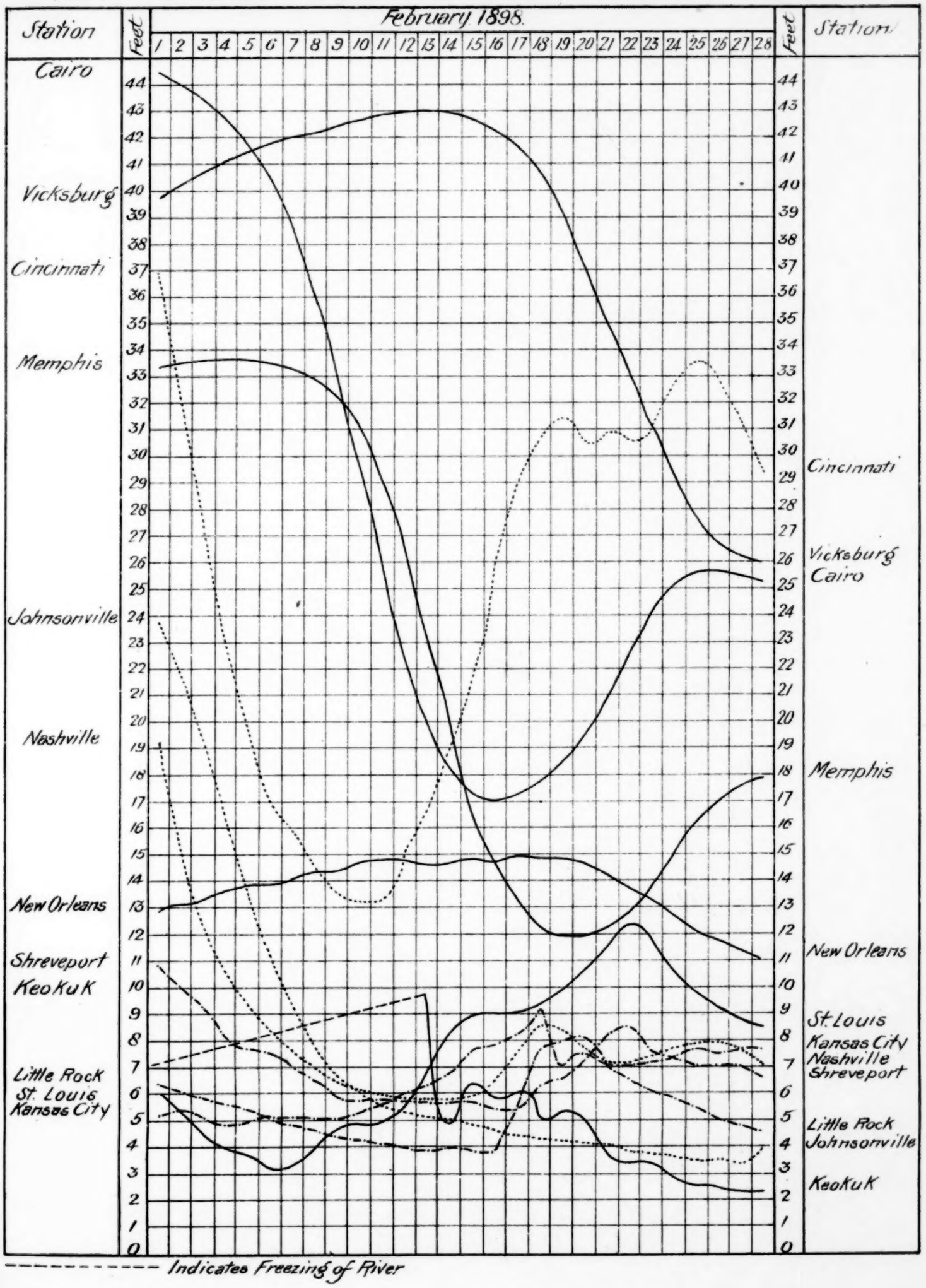


Chart VI. Surface Temperatures; Maximum, Minimum, and Mean. February, 1898.

Chart VI. Surface Temperatures; Maximum, Minimum, and Mean. February, 1898.

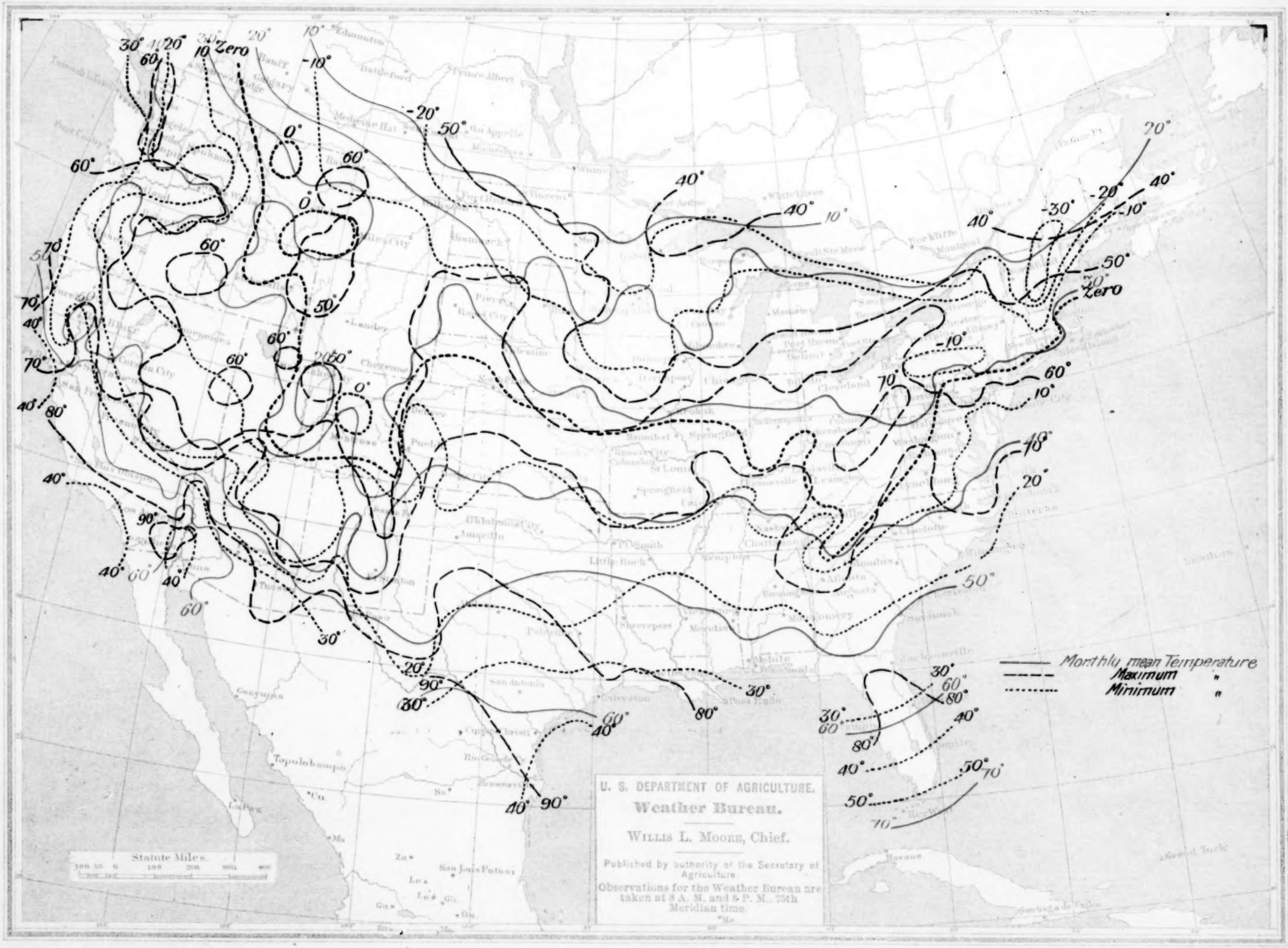

Monthly mean Temperature
Maximum "
Minimum "
Statute Miles
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Chart VII. Percentage of Sunshine. February, 1898.

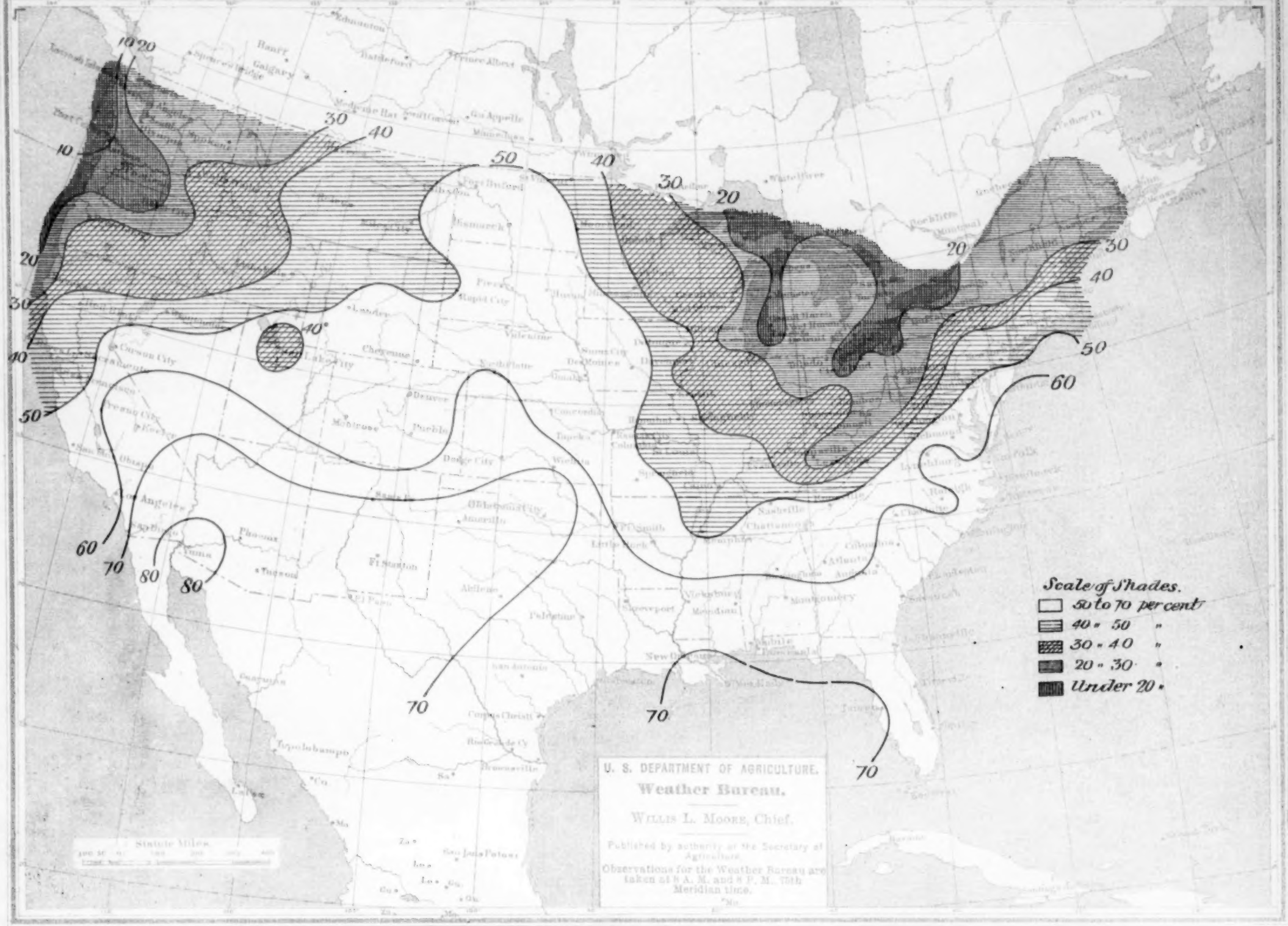

Chart VIII. Total Snowfall. February, 1898.

Chart VIII. Total Snowfall. February, 1898.

0"
5"
10"
20"
40"
Statute Miles
U. S. DEPARTMENT OF AGRICULTURE.
Weather Bureau.
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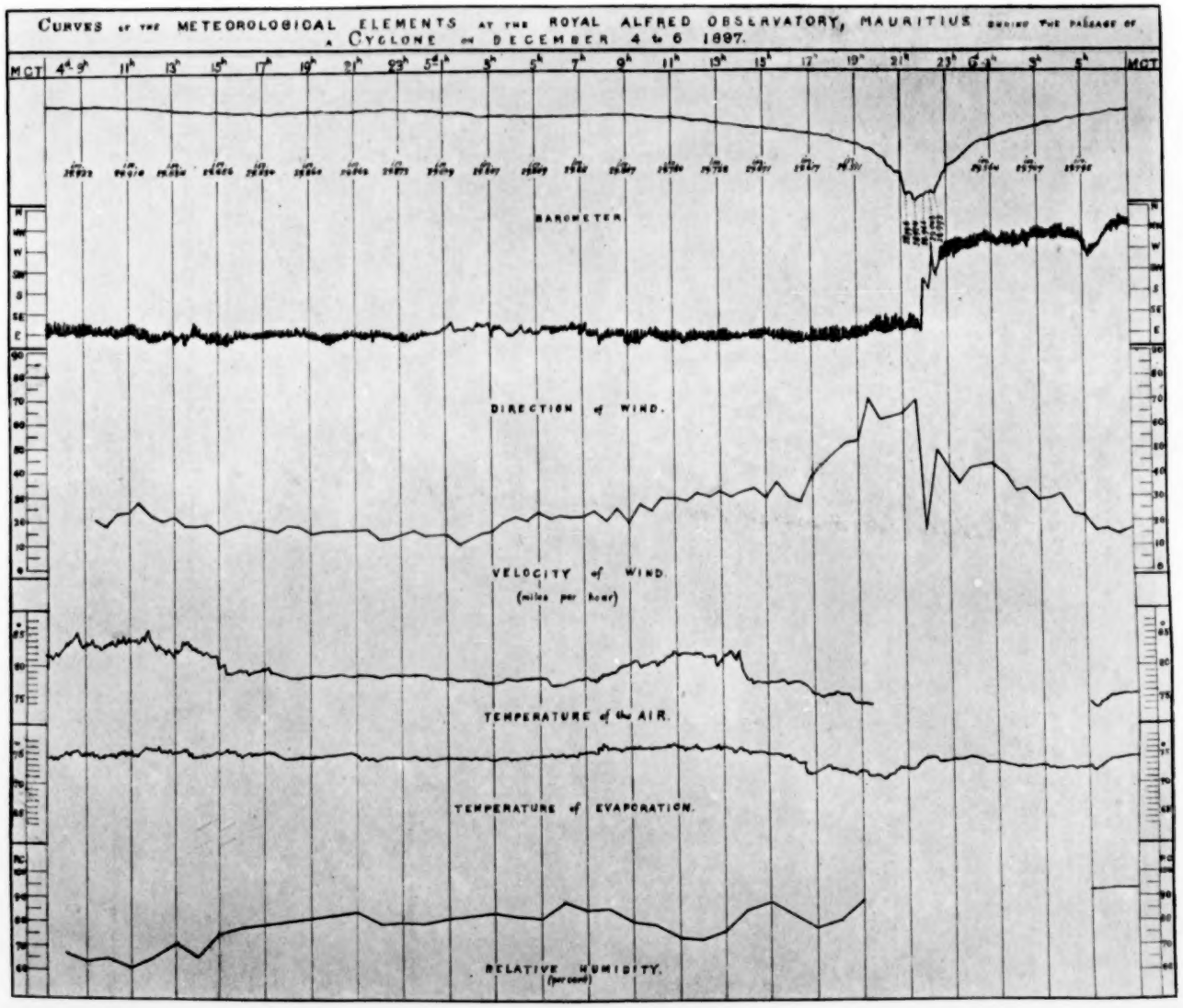
Observations for the Weather Bureau are taken at 8 A. M. and 8 P. M., 75th Meridian time.

Chart IX. Depth of Snow on Ground at the Close of the Month. February, 1898.

Chart X.


CURVES of the METEOROLOGICAL ELEMENTS at the ROYAL ALFRED OBSERVATORY, MAURITIUS during the PASSAGE of A CYCLONE on DECEMBER 4 to 6 1897.
MGT
BAROMETER.
DIRECTION of WIND.
VELOCITY of WIND
(miles per hour)
TEMPERATURE of the AIR.
TEMPERATURE of EVAPORATION.
RELATIVE HUMIDITY.
(per cent)